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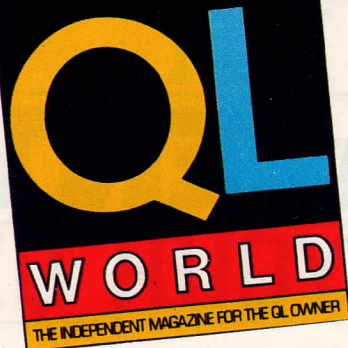
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Dear QL Owner,

Welcome to QL WORLD. We shall be sending you the next six issues of this exciting magazine absolutely FREE.

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Once you have received your fifth issue I shall be inviting you to subscribe to QL WORLD as this magazine will be available only to you by post.

So for now enjoy the QL and QL World - a great combination.

Yours sincerely

A handwritten signature in black ink that reads 'Carole Fancourt'.

Carole Fancourt
Magazine Services Manager

PS: We pay top rates for articles and programs published so don't hesitate to send any of your ideas to our Editor - he will be happy to look at them.

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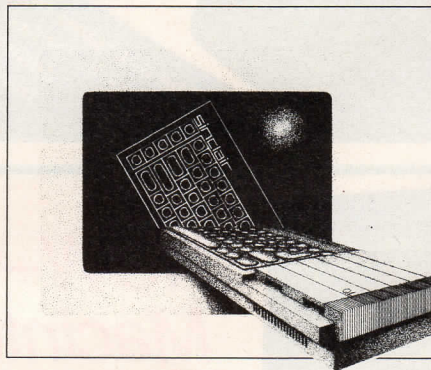
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Writing your own leisure software with the aid of the QL SuperBasic

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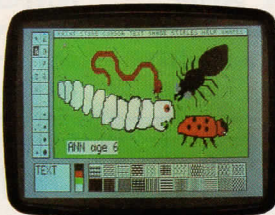
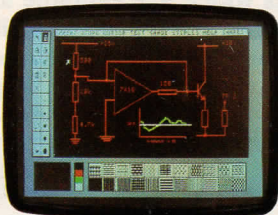
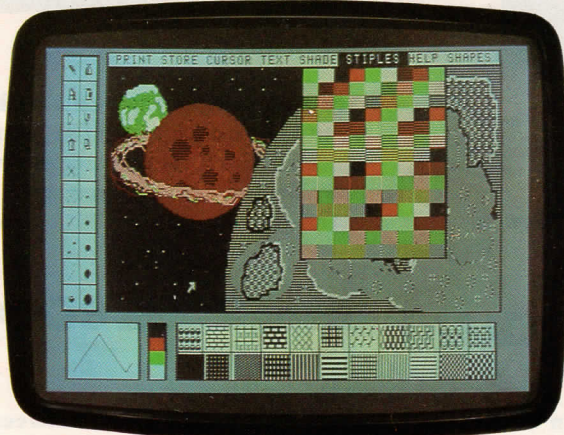
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Maxwell steps in to Sinclair

A SUBSIDIARY of Robert Maxwell's Pergamon group has taken a controlling interest in Sinclair Research and pledged a cash injection of up to £12 million through a new issue of Sinclair shares to boost the company fortunes.

The announcement followed talks between Maxwell, Sinclair Research founder Sir Clive Sinclair and their respective advisors. Hollis Brothers & ESA, the Pergamon subsidiary which will take a controlling interest in Sinclair Research, will take most of the £12 million worth of shares to be issued, with the rest being sold by Rothschilds — Sinclair's bankers — to other investors.

Sir Clive said the deal with Maxwell was the result of an extensive review of his options. "The decision was made to look for this sort of a deal some time ago. Sinclair Research wants a different style of management. I am not the sort of person to run an established business. I am good during the early rush-up, then it needs other hands. I am very glad to find Bob Maxwell," he said.

Maxwell's newspaper, *The Mirror*, revealed that there will be a new board of directors for Sinclair Research, which will be headed by Maxwell. Sir Clive will become life president and will remain active as a research consultant to Sinclair Research.

Ironically, news of the deal

emerged on the day Sinclair Research announced major breakthroughs in its Wafer Scale Integration project, which is designed to bring high-capacity, low-cost memory to the QL and the planned Pandora portable computer.

The company claims to have produced the world's first commercial wafer scale integration circuit and has completed the first tests on the new semiconductor technology.

The first wafer-scale product will be a 500K memory/mass storage device for the QL.

Interface race

TECHNOLOGY Research of Staines, Middlesex is to join the battle for the QL disc interface market. It has announced Delta Disk, an all-singing, all-dancing interface which includes Centronics printer output, extra RAM and an upgrade path.

The interface will support up to four single- or double-density 40- or 80-track drives. It is compatible with all three current disc standards — 5.25in., 3.5in. and 3in. — and integrates with Qdos, using a Tony Tebby-developed ROM.

The interfaces are in three models. The basic disc/printer interface costs £129.50, the Delta 64 disc/printer interface with

64K extra RAM is £199.50 and the Delta 128 disc/printer interface with 128K extra RAM is £249.50.

Software on card

ELECTRIC Software, a new Cambridge-based off-shoot of GST Computer Systems, is planning to offer software for the QL on credit-card-sized smart cards developed recently in Japan.

The cards will hold up to 32K ROM of program information and can be accessed through a special QL smartcard adaptor being developed by Electric Software. The company promises that the adaptor will not cost more than £20 and that the cards will sell to software houses for no more than £9.

Electric Software technical manager Mick Rouse says he expects parent company GST to be the first to put software on the card system, meaning that products such as 'C' and GST assembler have a chance of working with the cards.

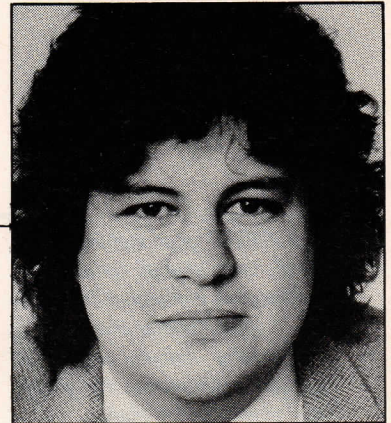
The 32K cards may not be big enough to hold the whole of a program such as 'C' but Rouse tells *QL World* that his Japanese suppliers are working on a 128K version of the card, which will be big enough to hold almost any program now available for the QL.

Computer One goes Forth

COMPUTER ONE of Cambridge has announced the implementation of the Forth programming language for the QL.

The announcement follows a string of earlier language and utility releases for the QL, including Typing Tutor, Pascal and Assembler.

Forth was developed originally by Charles Moore in the 1960s to help him control large telescopes in his observatory.



Geof Wheelwright

QL WORLD editor Geof Wheelwright is an experienced technical journalist who writes regularly for *The Times* Computer Horizons pages, as well as the *Newsweek* New Products and Processes page.

He is also a former deputy editor of *Personal Computer News* and co-director of London-based Greenleaf Publishing. Wheelwright has written books about the BBC Micro, the Commodore 64, the Sinclair Spectrum and the Symphony integrated business software package for the IBM PC.

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Expansion cages

A NUMBER of companies are now understood to be planning card-cage style expansion units for the QL. The first is from Simplex and, appropriately enough, it is a two-slot device, probably the simplest of them, and allows a memory expansion unit and a disc drive to be hooked-up at once.

It is reviewed for us by Leon

Heller of IQLUG in this issue.

Heller says that CST, of first-on-the-market-with-a-disc-interface fame, is also planning an expansion unit, rumoured to have up to four expansion slots — meaning the disc interface, memory expansion and parallel printer card could all be plugged in at once.

NEWS

TO KEEP you up-to-date with the latest and best software releases for the QL, the following list contains most of the major software releases for the QL to date.

BEDSOFT, an obviously easy-going kind of software house, offers three leisure programs, i.e., games, under the names of *Gambler*, *Beat the Clock* and *Autodraw*.

The first two cost £5.95 while the last is £10.95. Bedsoft is at 30 Landsdown Road, Bedford.

Brainstorm — the supplier, not the state of the programmer — has a program called *Westmonster Palace*. For those who want to tax their imagination, the program costs £8.95 and is available from Brainstorm, 4

Lindsey Close, Cramlington, Northumberland.

QL Bank Account for the discerning home financier is produced by Cenprime Software and at £19.95 claims to be useful for sorting-out the overdraft it could create.

To take the plunge into full financial control, write to Cenprime Software, Dept. 1, 10 Castle Street, Rugby CU21 2TP.

Computer One has produced a *Typing Tutor* which for £24.95 teaches you to touch-type for somewhat less than it would cost you to learn at a secretarial college. For your Computer One tutor, write — or type — to the company at Cambridge Science Park, Milton Road, Cambridge.

CP Software offers *Bridge Player* which, like *Typing Tutor*, provides a substitute for a real person and can be shouted at

without a reaction. Occasionally it can also be beaten but that involves a good deal more effort. For £18.95 your partner for life is available from CP Software, 10 Alexandra Road, Harrogate, Yorkshire.

QL Super Backgammon is from Digital Precision and, judging from the name of its supplier, it must be super and not straightforward Backgammon. For £15.95 is available from Digital Precision, 91 Manor Road, London E17.

Games Workshop has produced a game called *D Day*. For adventure game fans who like an element of history, the package is available from Games Workshop, 27-29 Sunbeam Road, London NW 10 and costs £24.90.

Executive Adventure offers you a chance to get into the City

without leaving home. It costs £15 and is available from Inter-soft at 7 Richmond Road, Exeter, Devon.

On the games skyline are three programs, *Pacman*, *Golf* and *Qbert*, each at £10. Bearing in mind the excellent graphics capabilities of the QL, they are spectacular and are obtainable from New Horizon Software, Fourwinds, Cwn Lane, Rogerstone, Newport, Gwent.

Peak Electronics has finally reached the summit with its *QL Colour Quest* at £5. To embark on the adventure write to Peak Electronics, 32 Clifton Avenue, Hartlepool, Cleveland TS26 9ON.

Summit Software has reached its peak with two original games, *Frogger* and *Dungeon*, at £10 each. Summit Software is at 36 Wood Crescent, Rogerstone, Newport, Gwent. — *Jason Ball*

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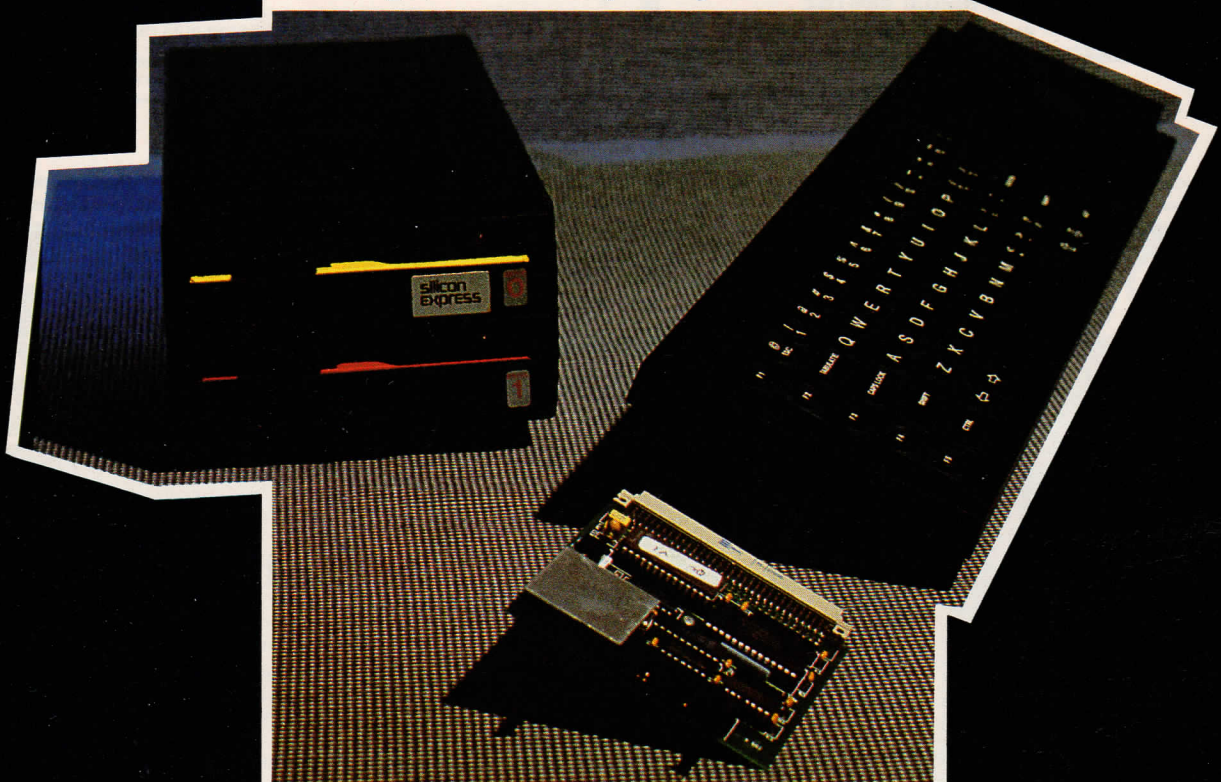
COMPETITION

Any brief survey of QL owners would probably reveal that there was one peripheral more than any other they would like to have for their machines. What is this magical device? Nothing other than a disc interface and drive system.

That also happens to be what we have on offer in this month's *QL World* readers' competition. We have teamed with Silicon Express to offer you a chance of one of its exclusive Insider Board disc interface units together with a single disc drive.

To win, you will have to do a little programming. We will award the prize to the entrant who presents us with the best set of file-handling utilities for the QL. The utility program should include all the basic functions such as file deletion, renaming, Microdrive or disc formatting, and any other file or storage manipulation facilities you think might be worthwhile.

The best program will be published by *QL World Ltd* and the author will, in addition to winning the Silicon Express system, also have



that program published by *QL World Ltd* and receive royalties based on the sales of it.

Entrants should send their programs on Microdrive with a self-addressed envelope.

Entries should be received by *QL World* no later than September 1, 1985 and *QL World* cannot take responsibility for any lost entries. Please write to:

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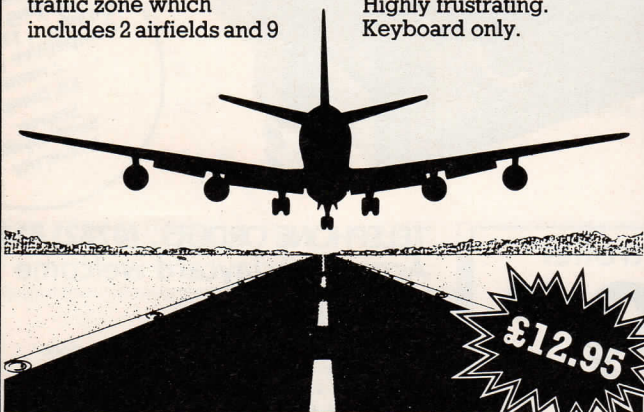


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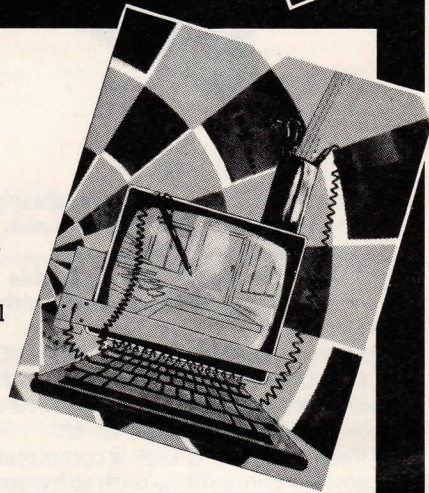
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GST expands its horizons

CATERING to a wide variety of users, including specialist software developers, academics, businessmen and domestic users, means that Sinclair, like any other hardware manufacturer, must ensure the quality and choice of software available to run on the QL. To achieve the aim, the company has contracted a number of software houses to develop operating systems, utilities and applications programs for the micro.

One such company is GST Computer Systems, which has developed several products under QDOS, as well as its own operating system 68K/OS.

Based in Cambridge, GST was formed in 1979 by Jeff Fenton, an ex-academic from the computer sciences department of Cambridge University. The company started as a technical consultancy but gradually has grown to include software and hardware development, turnkey projects, supply of contract staff, small-scale manufacturing, and installation and maintenance facilities.

In the last year the company has been expanding its original client base, which for the most part covered about a 50-mile radius of Cambridge. The client base grew from repeat and reference sources, something of a recommendation for any company, and Sinclair Research, also based in Cambridge, did not have to look far when seeking a software house to develop software products for the QL.

Chris Scheybeler, manager of the Systems Software Group at GST, explains that the group began to develop a new operating system for the QL in 1983. Now completed, the system, 68K/OS, is aimed, Scheybeler stresses, at the more specialist software developer, such as universities and software houses.

A bigger market is open to the company, however, through the several other commissions it has received from Sinclair. Scheybeler says: "We do not only develop software to sell on a speculative basis but also undertake contract work for companies. We have been doing a large amount of contract work recently for Sinclair, covering products under QDOS."

GST, Scheybeler says, recognised a need for quality systems products such as compilers, linkers and assemblers for the QL. Patently, so did Sinclair.

The most recent release from the company is the QC, the first C-Compiler for the QL, which appeared at the end of March. Although GST has not yet begun promotion work on the product, it is already selling in significant quantities to overseas QL distributors, as well as to QL users in the U.K.



Chris Scheybeler.

who have heard of the product on the grapevine.

QC comprises a C-Compiler, special assembler, the official Sinclair linker — which was also written by GST — and extensive QDOS run-time libraries. It costs £59.95

"We see the QL market as now big enough for quality games software"

and includes an 80-page manual, as well as a tutorial book on how to write in C, *A Book On C* by Berry and Meakings. Scheybeler comments:

"The QC package is ideal for the user who wants to move from Basic on to C." To emphasise his point he adds that Sinclair Research uses the product with the new developments progressing in the company laboratories. Scheybeler adds: "We certainly look to the C-Compiler as being our most successful product for the QL this year."

The company, however, is not relying entirely on QC for high-volume sales in the QL market. It has also developed two assemblers for the micro, the QL Assembler and the more up-market Structured Macro Assembler. The QL Assembler, Scheybeler says, is ideal for users wanting to learn 6800

assembly code, while the Macro Assembler, comprising the assembler, macro library, linker and editor, is aimed at the more specialist assembler programmer.

Unusually for that kind of product, the Macro Assembler includes high-level language features, such as the use of IF, WHILE and REPEAT. The Macro Assembler is not yet available, the masters of the program having gone to Sinclair for the Beta test, but Scheybeler expects it to be released in the next two months.

The official Sinclair Linker, also a GST product, is available — at a small fee, of course — to any independent software house wanting to write a compiler.

GST work with QDOS has also entailed contracts to modify the system to run with the various foreign language versions of the QL. "In a sense", Scheybeler explains, "we co-ordinate between Psion and the overseas distributors."

Meanwhile, the company has continued to develop 68K/OS. All the programs described here will run under K/OS as well as QDOS and Scheybeler adds that the system soon will also have disc support. When that support is available, it will be a plug-in card containing the disc controller chip and the 68K/OS ROMs, allowing programs running under both the K/OS and QDOS operating systems to share the same disc.

GST is also continuing to view 68K/OS as an OEM product, though Scheybeler declined to mention any other manufacturers' names. He explains that GST pursued the development of an OEM product based round the 68000 because it had seen a gap in the operating systems market at that level. That is a gap GST clearly plans to fill. Scheybeler says:

"Recent history of microcomputing has shown operating systems coming to the fore, associated specifically with particular chips. In the past we have had CP/M running with the Z-80 and MS-DOS with the Intel 8086 and 8088.

"The 68000 technology has not yet found its own operating system, particularly at the lower end of the market, though there are a number of contenders. We believe that our operating system is sufficiently robust, tried and tested to fill the gap."

The company also has an eye on the increasingly popular Unix operating system, with a product for the QL which, Scheybeler says, is still at the planning stage but on which the company expects to be working this year.

Expansion and development are obviously fairly high on the GST list of priorities. While the company will definitely port its QDOS products on to other 68000-based

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PROFILE

continued from previous page

machines, such as the Atari 520 ST and the new Commodore 68000, the Omega, as well as making the C-Compiler available to the MSX range of micros, through both those activities it will enable software developers to write programs which will run on a number of machines.

GST has also set up a subsidiary company, Electric Software, a specialist in consumer software for the QL. Scheybeler comments:

"We see the QL market as now big enough for quality games software and will soon be offering two initial products, *Backgammon* and *The Wreck*, a combined graphics and adventure game."

He adds that the company has recruited a number of younger people for Electric Software, because it is they who tend to have the interest and imagination for the kind of games which will become popular on the market. He stresses, however, that GST has ensured that the team also includes proven professional designers and programmers, to guarantee that the standard remains at what he describes to be the high level on which

the GST reputation is based. It is that reputation, built over the years with clients and colleagues in the Cambridge computing community, that GST is determined both to maintain and to expand.

As part of its expansion the company has, in the last year, been undertaking a recruitment drive, concentrating on finding people

"GST recognised a need for quality systems products such as compilers, linkers and assemblers for the QL"

with technical expertise rather than sales backgrounds. Scheybeler explains:

"Most of the clients with which we deal have a technical background themselves and want to discuss products and services in considerable detail. We are all able to cope with that, at least at the initial level, and when the client needs more specific exper-

tise, we call in an appropriately qualified member of the staff. So, although none of us is a salesman as such, we are all salesmen when required to be."

He adds that the company is, of course, ideally placed in Cambridge to find suitably-qualified staff. Many graduates, having spent three or four years studying at the university, want to remain in the area, and he stresses that GST is offering work in the leading edge of technology development.

GST plainly is determined to offer a reliable and professional service to clients and end-users, avoiding much of the publicity hyperbole found increasingly in the micro market in the last few years, and concentrating on product development. Scheybeler comments that while the market for the products developed under QDOS is more important to the company in terms of volume sales and numbers of users, the development of 68K/OS remains a project to which GST is thoroughly committed.

Whatever else may be happening, QL users, it appears, are assured of continued interest in the development of increasingly sophisticated software systems.

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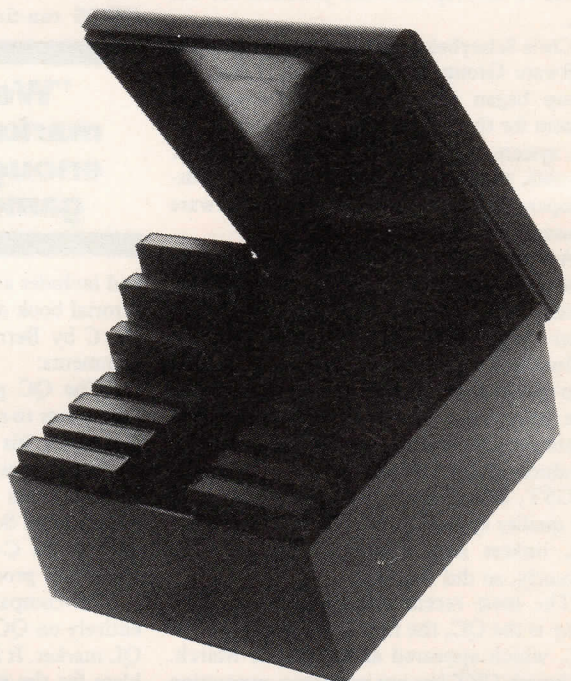
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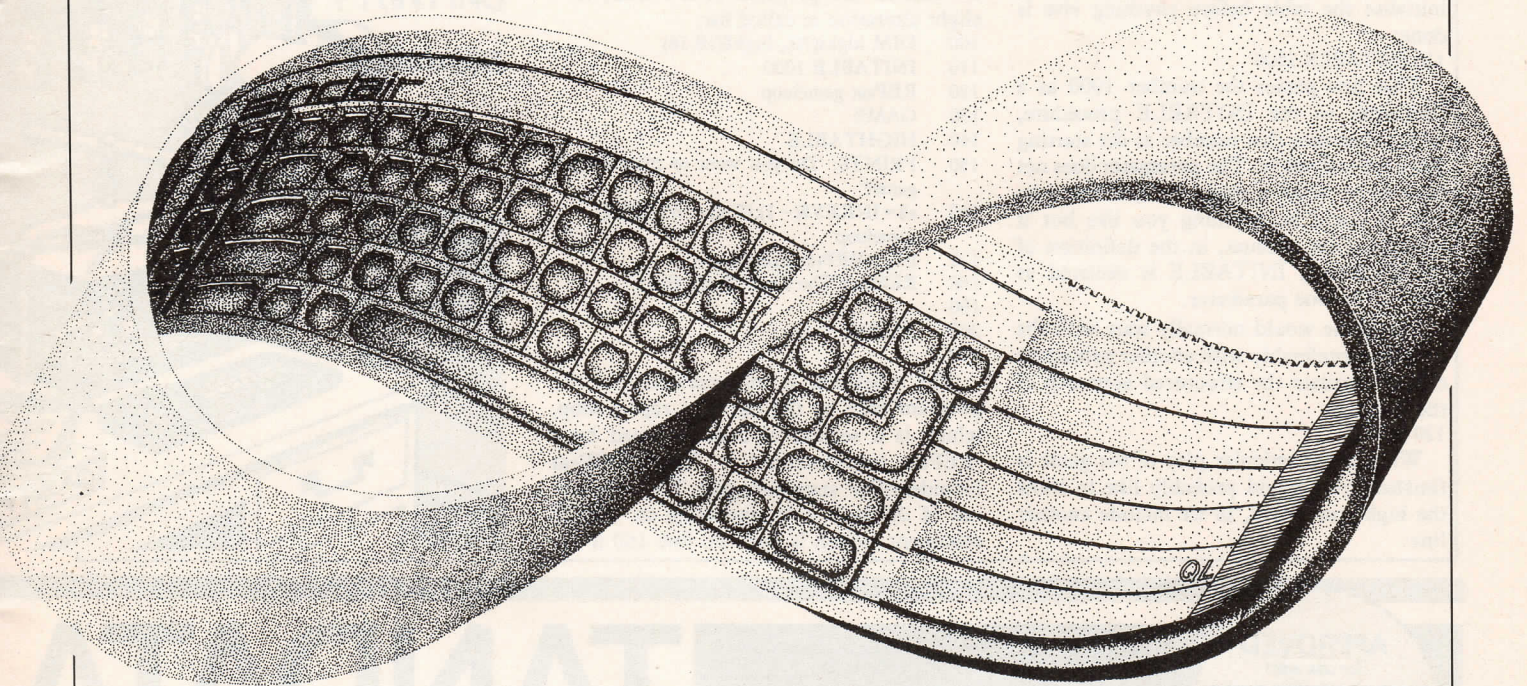
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TRANSFORM

Programming for diversions



The QL is a powerful machine well-suited to serious home and business tasks. But it is also a useful aid to enjoying your leisure time.

In the next four pages, we look at how the QL can best be programmed to provide games and other diversionary activities. In this first of a series on how to accomplish such programming, James Morrison looks at the importance of program structure and the role of subroutines in dividing your work into manageable sections.

You will notice also that the joystick or control ports of the QL can easily be used in programs as they generate the same computer codes as the space bar and four cursor keys (for control port one) and the same as the function keys (for control port two).

HAVE YOU ever written your own game, or as we call it, Leisure Software?

Have you ever wanted to? If the answer to either of those questions is in the affirmative, then it is probable that you have also played around with the QL SuperBasic interpreter to see what it is capable of doing. With all its modern, structured features, the language provides an ideal basis for learning to program but its functionality also allows you to use it as a powerful programming language. You can still take advantage of the struc-

ured portions, of course. You can set about doing this by writing a few procedures, functions and program sections which will be useful in real games programming. The first thing to look at is one of the most neglected parts of the game, the high score table.

Before you can start to write that, you have to define a few parameters. You need to decide on the number of entries in the table and the maximum length of each name entry. A good choice is a table containing 10 entries, where each player's name can be up to 16 characters long.

Three routines are shown here to deal with the high score table. INITABLE is a procedure which initialises the table to contain 10 entries, each with a specified starting score and each with a null name entry. HIGHTABLE is a procedure which displays the high score table on the screen and NEWScore is a function which checks whether or not a player's score should go into the table and, if it should, it puts it in the correct location and collects the player's name.

Before the routines can be used in a

continued on next page

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program, the arrays holding the scores and names must be declared by dimensioning them:

```
100 DIM highs(10), high$(10,16)
```

At the same time, it makes sense to initialise the table before anything else is done:

```
110 INITABLE 1000
```

That line passes the number 1000 as a parameter to the INITABLE procedure, which then uses that number as the starting score for each entry. The parameter does not have to be 1000; it could be 0, it could be 100. It could be anything you like but it must be there because, in the definition of the procedure, INITABLE is declared as having this one parameter.

The game would normally start with the next line, preferably with another procedure call to maintain the structured approach of the program:

```
120 GAME
```

When that particular play of the game is finished, you would probably like to show the high score table, so we include another line:

```
130 HIGHTABLE
```

There is a problem there, isn't there? Once the table has been shown, you should ask the player to press a key and the whole thing would be repeated. There is no scope for that in the program as it stands, so a slight alteration is called for:

```
100 DIM highs(10), high$(10,16)
```

```
110 INITABLE 1000
```

```
120 REPEAT gameloop
```

```
130 GAME
```

```
140 HIGHTABLE
```

```
150 PRINT0; 'Do you want to play another game?'
```

```
160 a$=INKEY$(-1):IF a$='n': EXIT gameloop
```

```
170 END REPEAT gameloop
```

```
180 REMARK The Game Ends Here ...
```

```
190 :
```

```
200 REMARK -----
```

```
210 :
```

The repetition is incorporated into the program here by the use of a repeat loop, which is a section of code enclosed by a 'REPEAT loopidentifier' — 'END REPEAT loopidentifier' statement pair. The only way out of the loop is by executing an 'EXIT' statement, which is done on line 160 if the



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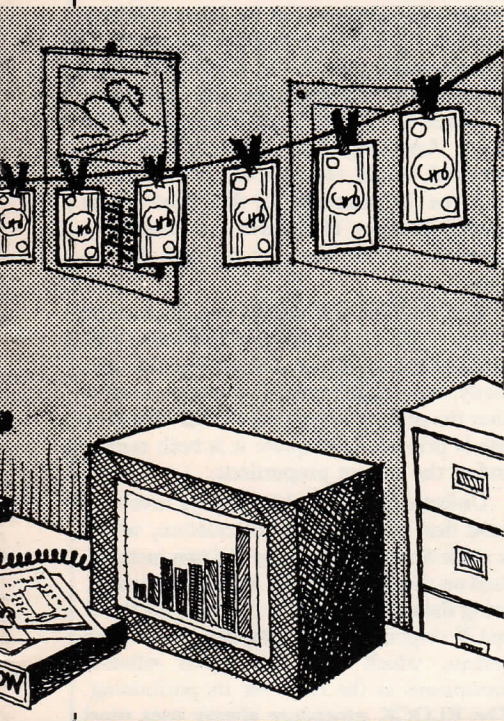
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'N' key is pressed in response to the prompt. Notice how the comparison

```
IF a$='n'
```

uses two equals signs; that forces Qdos to compare the strings in what it calls 'class 1' comparison, in which the case of each letter — i.e., whether it is a capital letter or not — makes no difference to the comparison. If you had typed

```
IF a$='n' OR a$='N'
```

you would have had the same effect but it is a little longer to type in.

Two points of style — the statements within the repeat loop are indented, so that it is obvious at a glance which statements are within the loop and which are not. Also, the few REMark lines at the end of the loop help to make the program a little easier to read, by splitting the main program loop and the procedure and function definitions.

The INITABLE routine has a rather simple job to do, so the coding is fairly simple, too:

```
32000 DEFine PROCedure INITABLE(start)
32010 LOCAL a,a$
32020 FOR a=1 TO 10:high(a)=start
32030 a$=' ':REMark 16 spaces
```

```
32040 FOR a=1 TO 10:high$(a)=a$
32050 END DEFine
32060 :
32070 REMark -----
32080 :
```

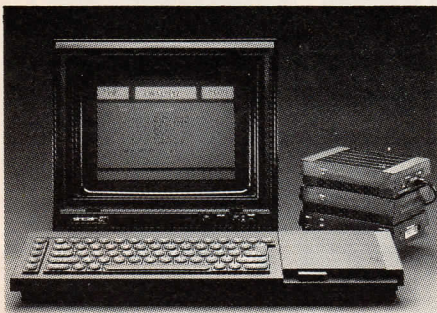
The first FOR loop, on line 32020, sets each element of the highs array to the starting score, and the second — on line 32040 — sets each name entry to 16 spaces. Notice how the two variables used in the procedure, a and a\$, are declared as being local to the routine; that means that the values of similarly-named variables elsewhere in the program will not be affected by the procedure. The two arrays holding the high score table, highs and high\$, are global variables, as they were declared at the start of the program. They are available to the entire program.

The HIGHTABLE routine prints-out the values of each score in the table, along with the name of each scorer. By default, it writes everything out to channel 1, so you must ensure that channel 1 is big enough to show all 10 entries. If you intend using channel 1 for other purposes inside the game, it may

continued on next page

COMMUNICATIONS SINCLAIR QL

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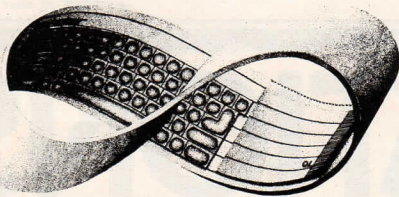
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be better to open a new screen channel which is big enough, and replace every occurrence of 'PRINT' with 'PRINT # chan;' inside the procedure, where 'chan' is the number of channel you have opened for this purpose.

```

32090 DEFine PROCedure HIGHTABLE
32100 LOCAl x,y
32110 CLS
32120 FOR x=1 TO 10
32130 IF x=10 THEN
32140 PRINT TO 10;
32150 ELSE
32160 PRINT TO 11;
32170 END IF
32180 PRINT xl'')!!highs(x);
32190 PRINT TO 30;
32200 FOR y=1 TO 16:PRINT high$(x,y);
32210 PRINT
32220 END FOR x
32230 END DEVINE
32240 :
32250 REMark -----
32260 :
```

This procedure uses the tabbing ability of the SuperBasic PRINT statement to print-out the high score table in as neat a way as



possible. Tabbing is effected by using the TO keyword, followed by the required column number. Notice how score number 10 is made a special case — we tab to a column of fewer than that used for other numbers. That is because '10' is the only two-digit number between 1 and 10, so to maintain the neat appearance of the table we need to add this IF . . . THEN . . . ELSE . . . clause on lines 32130 to 32170.

The NEWSORE routine is the most complicated of the three, as it has the most work to do. It must check the score passed to it as a parameter and if that score falls within the range of scores currently in the table, the lowest one — highs(10) and high\$(10) — must be knocked off the table, some scores and names may need to be moved down, and the new score and name need to be entered.

The routine is designed to return a result, so that the caller can determine where in the table the new player's score went. If the result of the function is zero, the score is too low to appear in the table, while if it returns a number between 1 and 10, that is the position attained in the table.

It works that out by first checking the new score against the lowest score in the table. If it is less than or equal to this — line 32290 — the function ends and returns zero immedi-

ately. If not, a loop is entered which searches through the highs() array backwards until it finds one, the loop will be exited with x holding the position. If no scores are greater than or equal to the new score, x will be zero.

Once the loop is exited, 1 is added to x to give the absolute position in the table. A further loop is then entered, moving each score and name below the new score down one position in the respective arrays. That means that the old score 10, the lowest high score, is thrown off the end of the array and removed from the table.

The routine then inserts the new score into the highs() array and collects the player's name from the keyboard. If the length of the string collected is less than 16, it must have spaces appended to it until its length is 16, which is done here with a simple repeat loop.

The new name is then inserted into the high\$(x) array at line 32460 and the position attained is returned as the function result.

```

32270 DEFine FuNction NEWSORE(score)
32280 LOCAl x,y,loop,a$
32290 IF score <= highs(10):RETurn 0
32300 x=9
32310 REPeat loop
32320 IF score <= highs(x):EXIT loop
32330 x=x-1
32340 IF x=0:EXIT loop
32350 END REPeat loop
32360 x=x+1
32370 FOR y=9 TO x STEP -1
32380 highs(y+1)=highs(y)
32390 high$(y+1)=high$(y)
32400 END FOR y
32410 highs(x)=score
32420 INPUT #0; 'You are in the table -
what is your name?' !a$
32430 IF LEN(a$)<16 THEN
32440 REpeat loop:a$=a$ & ' ':IF
LEN(a$)=16:EXIT loop
32450 END IF
32460 high$(x)=a$
32470 RETurn x
32480 END DEFine
32490 :
32500 REMark -----
32510 :
```

Now that all the high score routines have been written, the rest of the game can be looked at. It tends to help if you know what kind of game you are writing at this stage.

Suppose you had decided to write a sliding block puzzle simulator — one of those square things with 15 letters and a free space — which you have to arrange until you can make a few sensible words from the letters. If you were to write a game like that on the QL, the easiest way may be to draw the whole screen at the beginning of each invocation of the GAME procedure, using random numbers to ensure that everything is well out of order. Then, each time a move is

made, you can use the built-in SCROLL and PAN procedures to move the letters.

Let us look at a way of drawing the first screen. We will continue the structured approach by making a procedure do all the work. Assuming that an array has been declared inside the GAME procedure to hold the 16 positions, all that needs to be done is to draw 16 squares and then print letters in 15 of them, as dictated by the array.

The simplest and fastest way of drawing blocks on the QL screen is with the BLOCK procedure and, if you choose the size correctly, the CSIZE procedure can be used to alter the printed letter size, so that each time one is printed on a square it is both central and of the correct proportions.

Unfortunately, graphics always involve a good deal of co-ordinate calculation, which is made doubly difficult by the two methods used on the QL. They are pixel co-ordinates, using the entire screen as the basis for the X and Y origins, and the graphics co-ordinate system, which uses the scaled window dimensions as the basis for its positioning. The BLOCK procedure always uses pixel co-ordinates, whereas most other graphics routines use the other method.

Perhaps the easiest way to sort it out is first to draw the screen on graph paper, so that the drawn co-ordinates can be correlated with the screen co-ordinates with relative simplicity. BLOCK takes five parameters, which define the X and Y starting positions of the top left-hand corner of the block, the size of the block and its colour.

In the next issue, we will look more closely at drawing the squares, plus a few of the other procedures and functions involved in drawing our sliding block puzzle.



QL gets down to business

NO business computer is an island. It needs both the proper software and peripherals to tackle a given job. The Sinclair QL is no exception to the rule. Without those two essential ingredients, you and your computer will run aground on the rocks of futility or be swallowed up in a sea of frustration and disappointment. If you know how to choose and use business software and peripherals with your QL, that need never happen.

In the peripherals department, the QL is better-equipped than most as it includes two Microdrives for storage and will plug straight into standard display monitors and printers. Leaving aside for a moment the business of which printer? which monitor? or whatever, suffice it to say that there is a wealth of peripherals for the QL and their uses are reasonably straightforward.

It is your choice of software, however, which will really make or break the operation of the QL as a business computer. The QL, of course, has four excellent business software packages from Psion, but users do not live by bundled software alone.

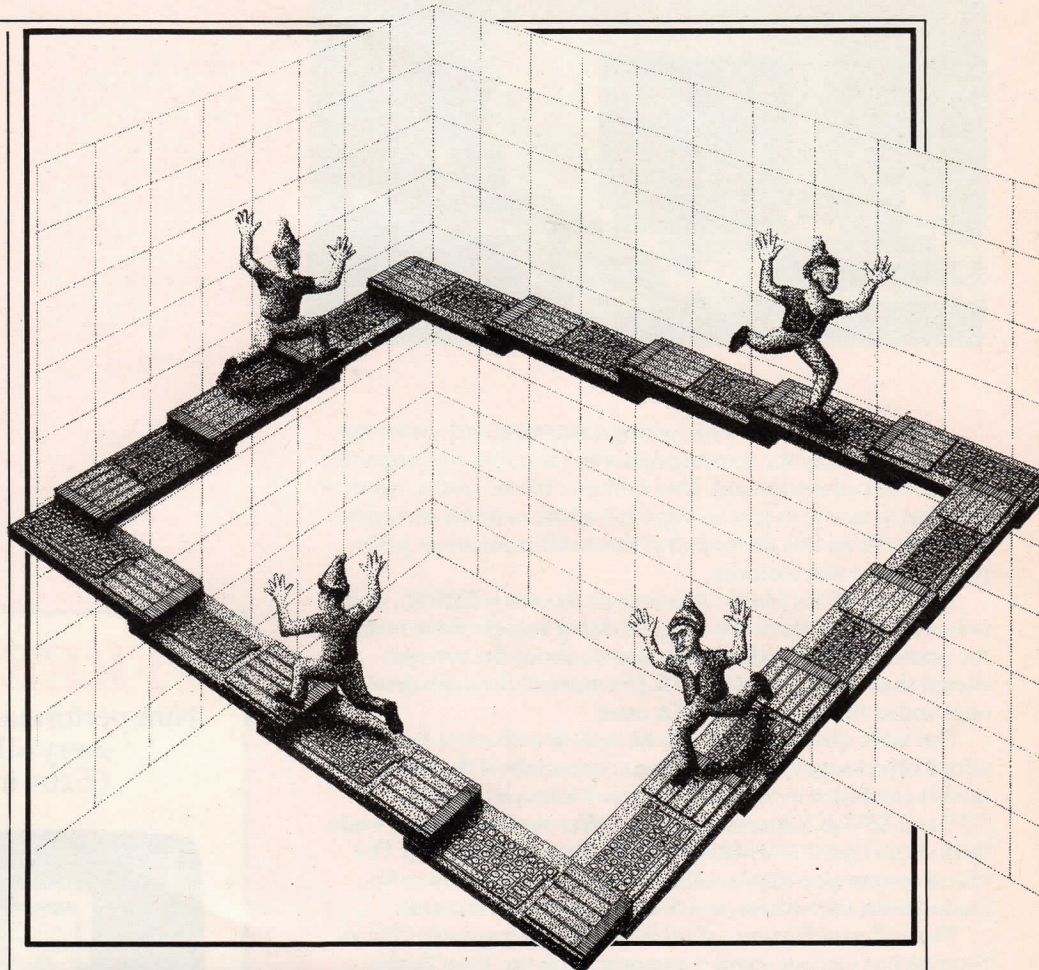
To get the most from your machine, you will have to look seriously at some of the other packages on the market. The importance of that decision becomes quickly apparent when you start thinking about the jobs you want to do with the QL.

Let us say, for example, that John Bloggs — Joe's brother — wanted to develop a business plan which would map out the international economic strategy of his company for the next year. We will suppose further that he decided to use a QL word processor to write and develop the plan.

He would figure planned incomings and outgoings for each month and when he had done that he would type them into a Quill document — with the ability to erase or change any figures he has incorrect.

Lo and behold, when he has finished typing-in the report and printed it out, Bloggs discovers that the pound/dollar value has changed dramatically and he has to revise all the figures, something which will take him some time, using Quill and his trusty pocket calculator.

By now, you are probably about to give up on John Bloggs, because you and I both know that old JB should have used the Abacus spreadsheet for the task in the first place. The point of this cautionary tale is that choosing business software for the QL means making sure you are using the proper package for the correct job. It may look easy to choose between a word processor and a



In the first of a two-part series, QL World editor Geof Wheelwright looks at the role of business software and how to choose it.

In the next issue we will look critically at some of the new QL business software.

spreadsheet to develop a business plan but what happens when you start trying to run the accounts of a small cash-based company with the QL? Do you use Abacus? QL Cash Trader? QL Integrated Accounts? QL Entrepreneur?

The only way to choose between those similar-sounding packages is by having a

very clear idea about what it is you want the QL to do for you. This method of software selection is known by the jargon-lovers as 'the systems approach'.

All it means is that you build up your computer hardware and software collection with the idea of developing a 'system' to accomplish specific tasks. Leaving aside the hardware for a moment, as it is dealt with elsewhere in this issue, the systems approach to software means a careful study of your needs.

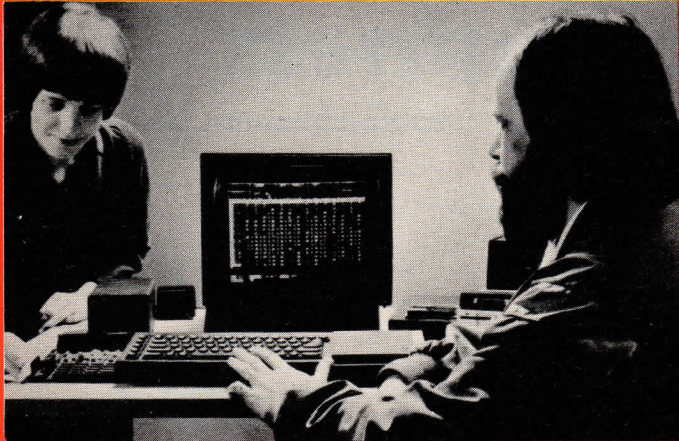
Just as a great Victorian once claimed that sleeping was a 'horizontal expression of a vertical thought', you will find that business software generally is a horizontal expression of a vertical need.

Your job is to discover just how vertical your needs are. In MarketingLand, a country lying between NeverLand and Consumer Land, vertical software is software written for people engaged in a specific job or profession such as milk production and planning software for dairy farmers or specially-designed columnar word processing packages for scriptwriters.

Unfortunately, vertical software, by its

continued on page 25

The MEDIC QLE



Two well-known, independent computer journalists compare the MEDIC system with the other systems on the market.

Disk drives are now becoming a standard add-on for the QL, and to supply the growing demand a number of companies have produced equipment. One of these, Medic Datatypes, asked us to assess its product against all the systems currently available. To do this we looked at three different areas; price, performance and features.

The price of the Medic interface on its own is £129.95, which puts it in the middle of the range. Adding a single drive brings the price to £249.95, which seems to be about the average, except that Medic supply a 720k (formatted) 3½-inch drive as opposed to the more usual 200k ones.

The table shows that the Medic system with extra memory added offers superior performance, especially if the RAM-disk facility (included in the Medic free software) is utilised. CST and Silicon Express interfaces offer similar timings, while those from Quest and MicroPeripherals are rather slow. The Quest system also requires the disk operating system to be loaded from microdrive, which adds another 10 seconds.

The software features of each system differ greatly. Silicon Express has just one extra command, from the Tony Tebby Toolkit, while Medic has most of the Toolkit commands and a large range of free software. Hardware features also vary considerably, Medic being the only system that does not require a further expansion board to add extra memory or I/O ports.

The choice seems to be between Silicon Express or CST, and Medic. The former are physically smaller than the Medic, but Medic has many extras such as built-in RAM disk software and an interface for Medic's forthcoming modem."

Roger Thomas

John Lambert

TEST RESULTS	1	2	3	4
Microdrive	2.5	6.5	13	167
Disk systems:				
CST	6	2	7	41
MEDIC	6	2	5	40
MEDIC + extra memory	6	2	5	25
MEDIC without extra memory, using free RAM-disk software	0.5	1	*	*
MEDIC + extra memory, using free RAM-disk software	0.5	1	2	6
MicroPeripherals	18	3	12	69
Silicon Express	7	2	8	36
Quest	19	35	39	**

Notes: 1 - save 32k code. 2 - load 32k code. 3 - load Quill program file. 4 - save Quill file, approx 10½ pages (3288 words, unpatched). For 1 and 2, directory booted into memory before timings taken.

*Timings for all Psion programs except Quill are similar to those shown below. Quill requires extra memory.

**Quill does not run on Quest without extra RAM.

MEDIC offer you immediate delivery of a complete expansion system for your QL. Choose the amount of extra memory you need, plus options of disk interface with parallel port and printer spooler, and modem - all contained simultaneously inside the MEDIC single-unit systemcartridge.

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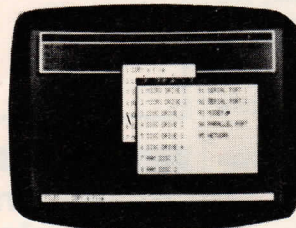
Extra memory, for speed and easier program and file handling, starts at £99.95. Complete systems, consisting of 1Mb disk drive, disk interface, parallel port, integral power supply and all cables, from £249.95. Even higher performance can be achieved by adding extra MEDIC memory to your disk system, utilising RAM-disk procedures available with MEDIC free software (see table for speeds).

You can upgrade your systemcartridge at any time, adding up to 512k extra memory, modem, and up to 4 disk drives.

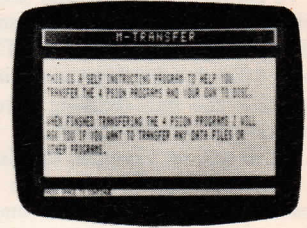
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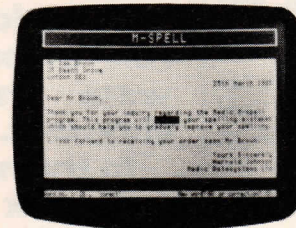
Nine performance-raising programs, free with every MEDIC disk drive system. (Extra memory recommended.)



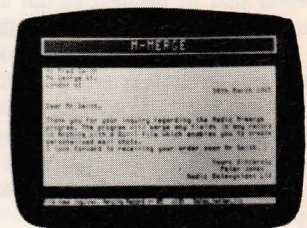
M-DESK



M-TRANSFER



M-SPELL



M-MERGE

M-DESK Macintosh-type single-key depression user interface, for instant program switching and utilities selection **M-BASE** turns Archive into a menu-driven database with single-key commands **M-ACCOUNTS** fully integrated sales, purchase, nominal ledgers, and stock control **M-KEY** single-key entry of user-defined text in any program **M-SPELL** spelling checker **M-MERGE** personalised mailshots **M-SQUEEZE** file compression **M-BOOT** sets up RAM disks in memory then automatically loads pre-defined files and programs **M-TRANSFER** microdrive - disk routine.

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256K	£169.95 <input type="checkbox"/>	+ FREE SOFTWARE	£399.95 <input type="checkbox"/>
Disk interface (if you already have disk drives)	£129.95 <input type="checkbox"/>	Complete systems + extra memory Add to complete system price	
Dust cover + 3 adjustable feet	£14.95 <input type="checkbox"/>	64K	£50.00 <input type="checkbox"/>
Disk pack Ten 3 1/2 in disks in rigid plastic storage box	£60.00 <input type="checkbox"/>	128K	£80.00 <input type="checkbox"/>
Modem* Add to disk interface or complete system price (not sold separately, since connects through systemcartridge)	£120.00 <input type="checkbox"/>	256K	£110.00 <input type="checkbox"/>
		512K	£200.00 <input type="checkbox"/>

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Payroll problems

IT IS difficult to believe that you can run a payroll program for 75 people on a QL but the TR Computer Systems *QL Payroll* program does that and TR volunteers that companies with more than 75 can run two programs to cope.

At one of its test sites, the QL runs the payroll and the mainframe has been relegated to other tasks. Some 30 payroll programs have gone to car parks, hairdressers, accountants, solicitors, farms and building firms.

For £55 you have two Microdrives, designated Paysys and Paydata — obviously one for the system and one for the data — a 60-page manual and two weeks of hand-holding. The program is also available on 3.5in. and 5.25in. disc. A £35 a year support deal offers a choice of discs and an updating service to keep in line with Government legislation.

Most problems, according to Tina Griffith, one half of the six-year-old TR partnership, are solved over the telephone and by the user sending a copy of the Microdrive and a printout of what has happened.

The menu-driven program may be operated stand-alone or in conjunction with a tailored software package. It copes with weekly- or monthly-paid employees and can include for each employee six deductions over and above tax, national insurance and pension deductions, one of which has facilities for loan repayment and one a variable deduction for each pay period. Deductions can be varied temporarily in any pay period and you can stop payments or pay back deductions during holiday periods.

Employees can be paid in cash or by cheque and the program will provide a coin analysis, or cheques on pre-printed stationery, as appropriate.

Trails

Only variable information needs to be entered in each pay period. For example, if hours worked are changed you do not have to feed-in information on tax and national insurance. Audit trails are prepared automatically to show hours and pay.

Employees' pay can include basic hour at a basic rate plus lump sum basic pay, overtime at up to three rates plus lump sum overtime pay, bonus payments and miscellaneous payments such as expenses.

Pay can be pre-tax adjusted and Statutory Sick Pay reclaimed from employees' pay or salaries. Calculations for SSP are not possible on the machine — the user has to do them and enter the results but the machine can keep a trail of them. Company pensions

can be deducted at a fixed amount for each pay period.

The program will also produce a range of reports showing details of the payroll — how much SSP or how much bonus is due, for example, on a weekly or monthly basis.

Payments can be rounded to the nearest £1, 50 pence, 20 pence, 10 pence or 5 pence and the system allows you to specify a minimum number of £1 notes in a pay packet. That is part of the coin analysis facility and permits the employer to obtain the correct denominations from the bank.

Payroll files need not be updated until the next pay period, so the employer has a week or a month to fill in omissions or errors, produce a payslip and an associated analysis for the employee rather than being faced with immediate deadline. The machine will print-out payslips with or without pre-printed stationery, as well as coping with P60s and P35s. Apparently it is easier to write by hand a one-off P45 but the machine will do the calculations for you anyway.

There are also screen enquiry facilities, so the employee can see how the payslip is worked out and the employer can see how many people are away sick without going through all the files.

There are 20 options available from the standard menu providing file maintenance, posting and reporting facilities.

Bob Griffith, a programmer who has written for mainframes to micros, wrote *QL Payroll* in SuperBasic but the company thinks it is 'too easy to copy'. An accounts package — sales, purchase and nominal ledgers — which will be available soon, will probably be written in BCPL and the next venture after that will be a stock control program.

QL Payroll, TR Computer Systems, Hine Heath, Stanton, near Shrewsbury. Tel: 093-924 621.

Cash smash

QL CASH TRADER is aimed at the small business — the little enterprises run by people who are neither accountants nor typists and certainly not computer buffs. More specifically, it is for people who want a quick and accurate method of following cash-based transactions rather than credit transactions.

At the press of a button, you can discover how your business is doing and how particular transactions are affecting it. By bundling into the QL the excellent Psion software suite, Sinclair encouraged the software industry to re-invent the wheel in terms of business software. One area omitted was accounts and *Cash Trader* has leapt in to fill the breach.

It is published by Sinclair Research, licensed from Quest International, which acquired it from Accounting Software of Torquay, the author of *Cash Trader*. Quest killed its own integrated accounts offering, Tally, in favour of the program.

For £69.95, you receive a manual, three Microdrives — 300KB in all — from Sinclair and six weeks' support from Quest. For an annual fee of £25, you can have membership of the *Cash Trader* Support Club.

Built into the program are 14 working examples from the manual which you have to 'pass' before it will permit you to use it on your business. You are compelled to take back-up copies from the start. Once you have mastered the examples, a routine called Clean Down puts them out of the way each time you want to run the program.

On screen, three windows display Help/Entry/Reporting facilities. Help will list the types of transactions of income and expenditure under 110 possible headings which are defined by the user — for example wages and salaries, stationery, post, entertainment, motor, telephone.

Auditing

Just as most businesses accumulate paperwork in a random fashion, *Cash Trader* on the QL allows you to enter data in any order while the machine sorts it by date and type of invoice. It extracts and accumulates VAT automatically and you set the rates accordingly, i.e., zero or standard or exempt. The printout from the VAT and other accounts can then be used for auditing and for VAT returns.

Quest is planning some 'bolt-on' modules for *Cash Trader*, including more detailed analysis of profit and loss and balance sheet and an invoicing module. It is encouraged by the performance at its test sites, ranging from a chartered surveyor, a computer buff who thought the program would revolutionise the software world and an equally enthusiastic accountant. Written originally in SuperBasic for the QL, *Cash Trader* is now being developed for the IBM PC and its clones and other machines, including the Apple IIe and IIc, Apricot and F1, the Amstrad and the Epson PX-8.

QL Cash Trader, Sinclair Research, 25 Willis Road, Cambridge CB1 2AQ.

Archive arrives

AS YOU will have noticed, the QL arrives with four programs described as being business packages. By now you will have grown sick of writing the same letter to your bank manager to justify your £400 overdraft, you will have what-if-ed your household budget well into the 21st century, and you may even have graphed the decline and fall of your software budget as more and more expensive games have been surpassed by versions on the Spectrum of your next-door neighbour.

That leaves you with Basic — and while there are few better implementations, the language is a restriction in itself for real work — and Archive. In most cases that leaves you with Basic.

Archive is not the prettiest package available and is far from being the easiest system to use but, given the machine on which it is most implemented, it is as powerful, in the business sphere, as you

HELP press F1	EDIT ESC to exit TAB & SHIFT/TAB to select procedure Cursor keys ↑↓ to select line F4—insert mode F5—line edit	COMMANDS press F3 ESCAPE press ESC
------------------	---	---

```

alist
animal
aninew
answer
anymore
aparse
choose
consolid
delay
guess
alist
aparse
question
start
tellus
toldys

proc alist
choose
all
if question$(1 to 1)="a"
print question$
else
rem skip
endif
endall
close
endproc
    
```

are likely to find at the price. Unless you have a problem seeking a solution, you will find that Archive is too difficult to start and you will probably fall into the trap of using Basic in situations where Archive would be more appropriate.

The problem with all databases is that you have to put data into them, and that means typing, and that means checking your spellign (sic) and most users do not have the patience to experiment. Psion has thought of that and provides a “ga-

zet_dbf” to play with. Playing is about all that it is useful for — playing and checking that some of the commands you have paid for work.

All that is a short way of saying you can program, using the language of Archive, everything from ‘vertical’ business software to games.

To provide a gentle introduction to that programming language, we will feature some leisure software written in Archive in the next issue — *Pat Crabb*.

continued from page 21

very nature, appeals only to a limited market and thus is expensive and difficult to sell. That has resulted in the rise of the horizontal package which attempts to be all things to all users. Essentially there are two types of horizontal software:

- Easy-to-use but limited general-purpose programs; they allow work to be done as it is defined by software engineers and hardware limitations. They include word processing programs such as Quill, business programs such as Abacus and Easel, and accountancy programs like Cash Trader, Home Finance and Integrated Accounts.

- Tough-to-master but powerful business development packages which can be tailored for various vertical tasks. Among the most powerful of the programs is the Psion Archive, which contains its own database language and allows you to develop complex information systems, although it is not that easy to use or learn immediately.

Many software packages combine elements of both the foregoing groupings but usually they have an overall approach which falls in one or other of the categories. Which type you require depends a great deal on your needs.

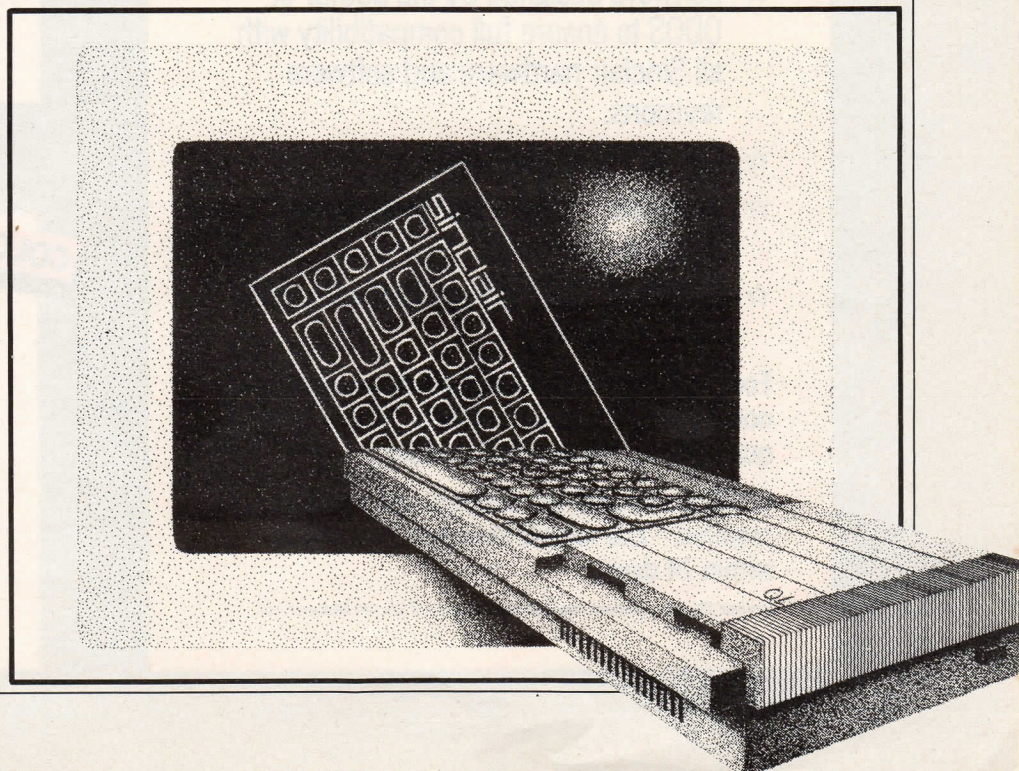
The first category of programs assumes that the software developers know your needs and that all you have to do is choose a pre-written package which matches those needs, while the second assumes, often correctly, that no software author can imagine

all your exact requirements and that the best option is to offer you powerful tools to create your own application.

So far, most of the business applications software for the QL is of the first type and that is entirely appropriate. The majority of QL owners are tackling a computer for the first time and they need something which is relatively easy to use and which can plug in

and go. Even if you are ready to tailor your own application, it is important that first you have a good understanding of what business software can do.

- In the next issue we continue our examination of business software with a round-up of the more interesting programs available for the QL.



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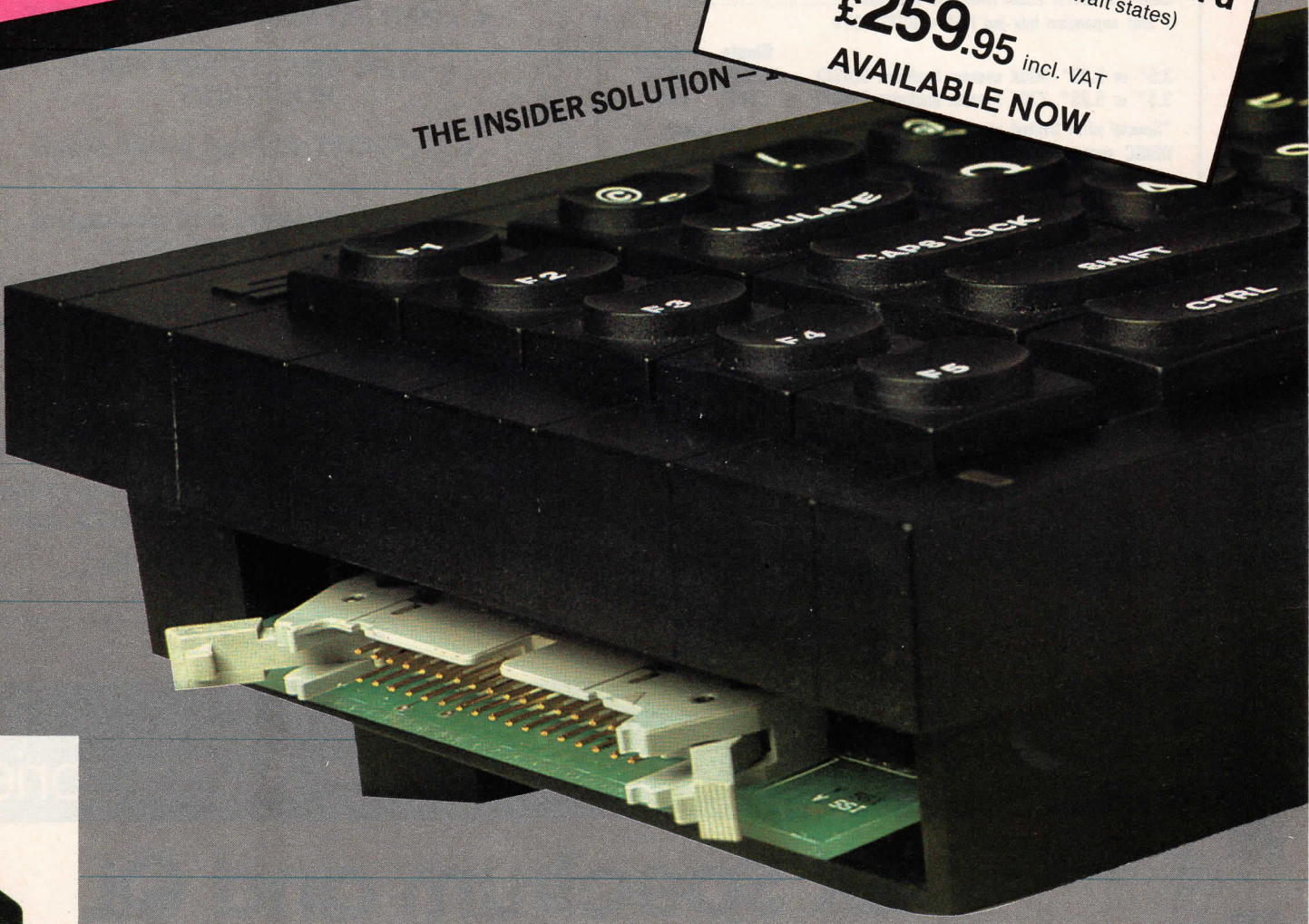


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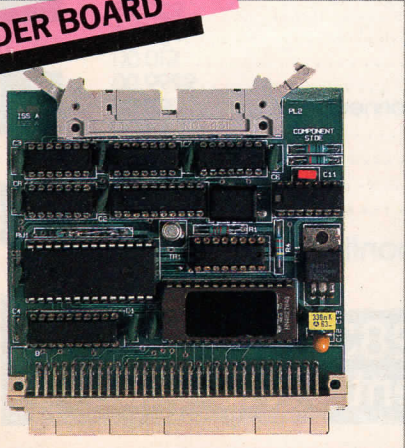
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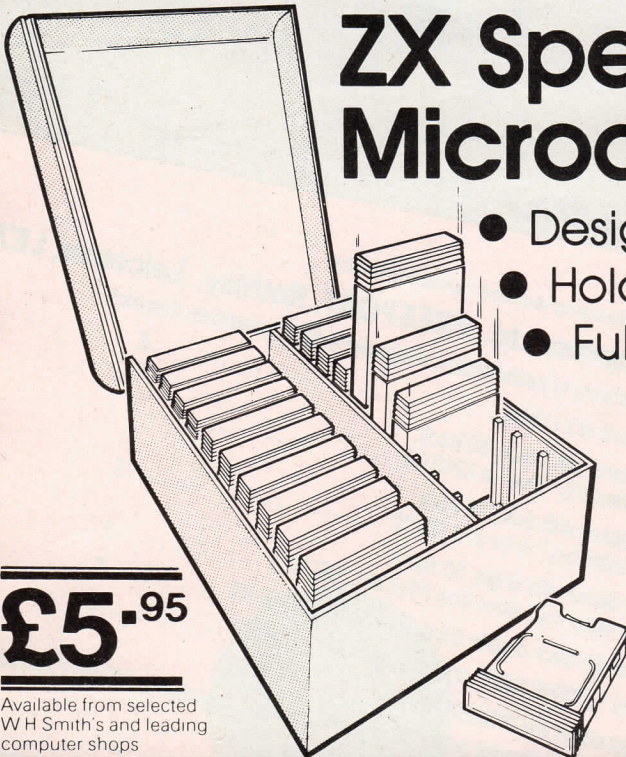
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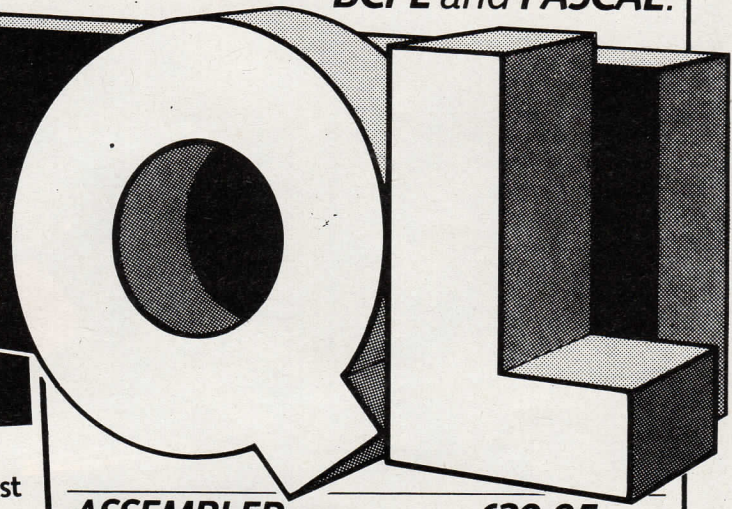
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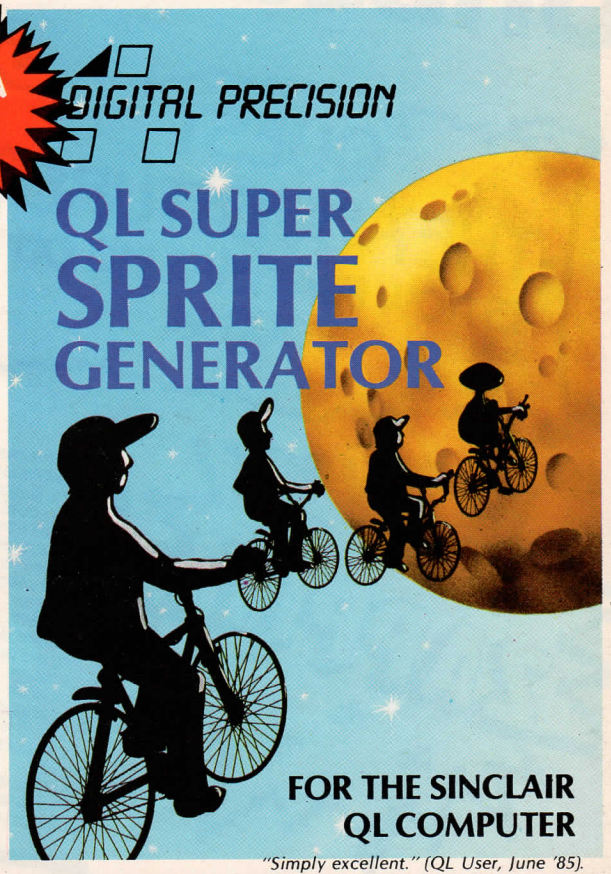
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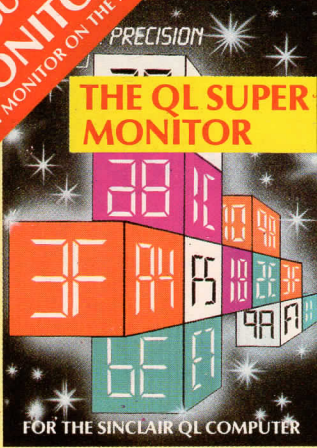
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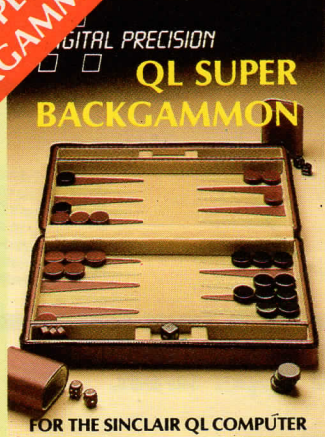
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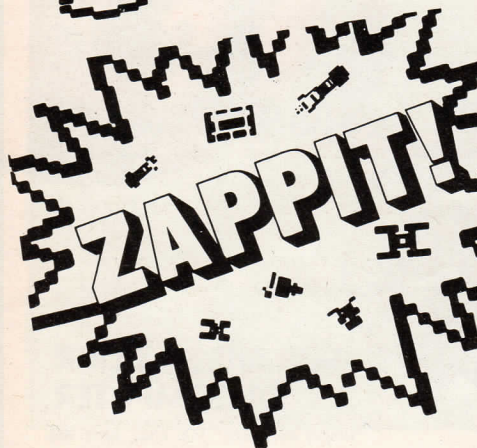


"Quest - The Adventure" is a graphics adventure game for the QL, structured to present a series of increasingly difficult challenges as you strive to amass loot among the uncharted islands of a shark and cannibal infested sea, avoiding marauding buccaners and natural hazards as you navigate to and from your home port.



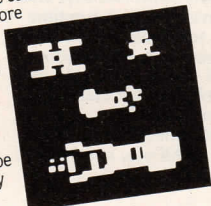
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Until a vast number of games is available for the QL, there is an alternative - design your own! With Zappit! from Quest the generation of sprites is easier, faster and more versatile than ever before.

Zappit! is a simply used sprite design program allowing sprites to be tailored exactly to your requirements and using the full colour capabilities of the QL.



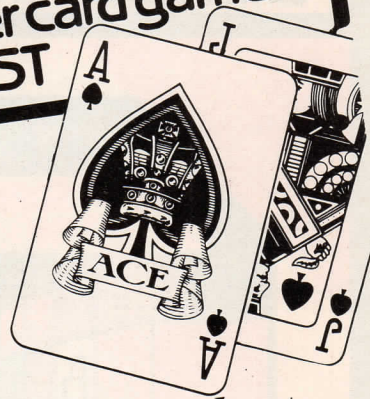
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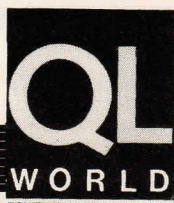
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CST launches expansion unit

QL WORLD has offered me this page to inform readers of the activities of the Independent QL Users' Group, writes Leon Heller, chairman of the group. Membership is by subscription to Quanta, the monthly group newsletter, which has 40 pages of members' letters, a problem section, reviews, software listings, and general information about the QL scene.

The group maintains a big software library, most of which is free to members. The library comprises more than 10 cartridges, containing games, utilities and Archive procedures.

Other benefits of IQLUG membership include a free advice service, workshops, support for local groups, and substantial discounts from some suppliers of hardware and software. The group is non-profit-making and is organised democratically, with the officers elected at the annual meeting. More information is available from Brian Pain, 24 Oxford Street, Stony Stratford, Milton Keynes MK11 1JU. Tel: 0908 564271.

Tony Tebby, author of Qdos, recently addressed an enthusiastic meeting of IQLUG members in Cambridge. He spoke for five hours, answering questions about Qdos, Microdrive operation, SuperBasic, disc drives and other matters.

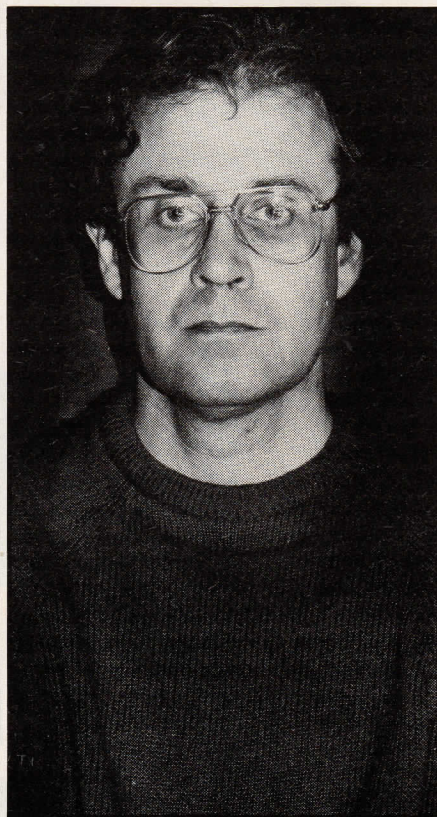
Martin Baines of CST demonstrated the new CST/Computamate Plus 4 expansion unit, which allows a memory expansion

'A standard 180-degree five-pin DIN plug will supply all the signals required for a composite video monitor.'

module and up to three peripheral devices, including a disc interface and IEEE port, to be interfaced to the QL. A parallel printer port is built-in and can also be used as a mouse interface.

I have heard that an enterprising company in Germany will, in return for £200 or so, take out the 64K RAMs from your QL and replace them with 256K devices, giving a full 512K with no external appendages.

I have one reservation about the scheme; internal RAM expansions of that kind will probably run at the same slow speed as the standard 128K, whereas external RAM, such as that supplied by Simplex, runs about three times as fast. One member who works for a big computer company has "liberated" some mainframe memory boards and wired



Leon Heller

them into his QL. The inside of his machine is a fearsome sight, with wires all over the place. Do not do that kind of thing if you are concerned about the warranty.

A useful tip from IQLUG member David Stevenson. A standard 180-degree five-pin DIN plug will supply all the signals required for a composite video monitor; you need only an eight-pin plug if you have an RGB monitor. I use a three-pin plug with my mono monitor. Stevenson also recounts how he recovered an important file from a jammed Microdrive cartridge, by opening it, untying the knot, re-threading the tape and putting the cartridge together again.

Disc users with the CST/Computamate interface — version 1.07 software and above — may be interested to know that they can read and write disc sectors directly, using SuperBasic:

```
OPEN #3,'f1p1_*d2d'
```

```
followed by
```

```
GET #3/x, a$
```

where $x = 65,536 * \text{track} + 256 * \text{side} + \text{sector}$, will read a sector into the string variable a\$.

Using the technique I have transferred the contents of an IBM PC disc successfully on to a QL disc. My thanks to Baines for telling me about this and Tebby for clarifying one or two points.

I think I have discovered why no-one can buy Microdrive cartridges — Camberley is

giving them all way. Many IQLUG members, myself included, have received two or more sets of Psion software upgrades. The record stands at five sets.

Several members, and many other people, must be wondering what to do if, as a result of several big, glossy advertisements in the computer press, they order goods from an ostensibly reputable company which cashes their cheques and charges their credit card accounts without delivering the goods they have paid for, and then goes into liquidation.

An IQLUG member who is also a barrister has sent me some notes on the legal position as he sees it. Here is a brief summary:

Customers paying by cheque or postal order are unsecured creditors and should send a claim to the liquidator. They will be last in line for any money resulting from the liquidation and might get a few pence in the pound if they are lucky.

Customers whose credit card account was debited — £100 or less — might be able to

'If goods cost more than £100 the customer has a valid claim in law against the credit card company.'

bring an action for fraud against the company employee who performed the transaction, or one of the former directors of the company, but that would be very difficult and would probably cost more than the amount claimed in legal fees, even in the Small Claims Court, unless they had some legal knowledge and handled the case themselves.

It might be possible to claim against the credit card company under Section 83 of the Consumer Credit Act 1974 but that would be even more difficult and costly if the credit card company contested the claim. Unless you enjoy litigation it is probably best to approach the liquidator.

If the facts are as in the previous example but the goods cost more than £100 the customer has a valid claim in law against the credit card company under Section 75 of the Consumer Credit Act 1974, as amended by the Consumer Credit (Increase of Monetary Limits) Order 1983, S.I. 1983 No. 1878. That applies only to credit card companies which give credit, like Barclaycard or Access, and not companies like American Express or Diners' Card, which require payment of the whole account each month.

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Remember, GST are officially recognised by Sinclair as leading developers of software and hardware for the QL. QC is one such product.

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QC Data Sheet

The C language

The C programming language was developed in the mid '70s at Bell Laboratories by Kernighan and Ritchie and is now confirmed as the standard systems programming language for the majority of software houses, universities and computer manufacturers.

C combines all the advantages of program structure provided by a high-level language with the ability to manipulate the machine hardware directly by using data types that correspond to the memory architecture, making the use of assembler largely unnecessary.

The power and flexibility of C ensures its continuing growth in popularity. It is the essential skill for the professional programmer in the '80s.

The QC compiler

QC is the first C compiler available for the QL that runs under QDOS. QC provides both the professional programmer and the first-time user with a complete set of C development tools:

- **C compiler** to compile C source to 68000 assembler code
- **68000 assembler** to translate 68000 assembler code to relocatable binary
- **QDOS run-time libraries** providing access to QDOS functions from C
- **Linker** to link the library routines with the relocatable binary
- **Screen editor** for the creation and editing of C source code
- **Menu-driven 'shell'** to automate the compile/assemble/link process
- **Window manager** to change the size and position of program windows
- **Backup program** for automatic microdrive or floppy disk backups

The compiler, assembler and linker produce comprehensive listing output. This includes a formatted printout of the generated assembler code with the C statements inserted as comments, which is ideal for program debugging.

The QC compiler also allows the programmer to code assembler statements directly in the C source code by using the

#asm and **#endasm** directives. This enables the C programmer to use assembler for optimisation of critical areas of the program without recourse to separate assembler modules.

QC language features

QC is an extensive subset of the C language with extensions provided for assembler code inserts and QDOS library functions. The major differences between QC and the C language defined by Kernighan and Ritchie are:

Additional QC features

Comprehensive run-time libraries
Assembler code inserts
Listing control directives

Not implemented in QC

Structures (struct, typedef, etc.)
Floating point
Multi-dimensional arrays

The balance between the language subset and the new features of QC provides a powerful systems programming environment that can be used on a standard QL with no extra hardware.

QC libraries

QC is supplied with two sets of library subroutines. The first contains the standard C run-time routines which will be familiar to experienced C programmers. The second is a special QDOS library providing easy access to all of the QDOS system functions without the need to drop into assembler code. The complete list of library routines supplied is:

abort	curdown	fgets
abs	curleft	fill
adate	curright	flash
arc	cursen	fopen
at	cursor	fount
atoi	curup	fprintf
atoi	date	fputc
avail	delay	fputs
beep	delete	fread
block	dtoi	free
border	ellipse	freopen
calloc	exec	fscanf
ccargc	exit	fwrite
cfree	fclose	gcursor
circle	feof	getarg
clearerr	ferror	getc
cls	fflush	getchar
csize	fgetc	getpos

getwindow	lseek	strcat
ink	malloc	strchr
isalnum	nextline	strcmp
isalpha	otoi	strcpy
isascii	over	strip
isatty	pan	strlen
iscntrl	paper	strncat
iscons	point	strncmp
isdigit	poll	strncpy
isgraph	printf	strrchr
islower	putc	tab
isprint	putchar	toascii
ispunct	puts	tolower
isspace	qdosdate	toupper
isupper	random	trap1
isxdigit	read	trap2
itoa	readdir	trap3
itoab	recol	under
itod	reverse	ungetc
itoo	rewind	unlink
itou	rnd	utoi
itox	scale	warble
keyrow	scanf	window
left	scroll	write
lexcmp	sdate	xtoi
lexorder	selwindow	
line	sign	

Hardware required

The QC compiler, assembler and linker, together with the QC utility programs will operate on a standard QL from microdrive cartridges. QC will also operate with all QL peripherals (such as floppy disks) that use standard QDOS input/output functions and with add-on RAM packs.

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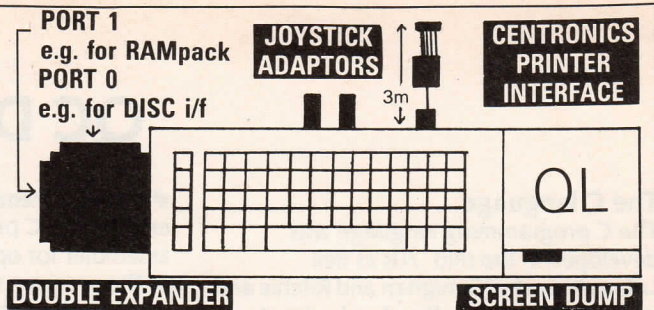
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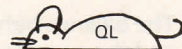
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02	09 45 CALL BROKER		06	07 08 09 10 11 12
03			13	14 15 16 17 18 19
04	11 11 SEND CABLE TO USA		20	21 22 23 24 25 26
05			27	28 29 30 31
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THE QL SuperBasic interpreter has an unsung advantage over other Basic interpreters — it is extendable. You can add your own procedures and functions to it, making them available to you at all times. There are two ways in which you can do so, one of which is far more interesting than the other.

The obvious way is to write your own routines — using DEFine PROCedure and DEFine FuNction — but that method has two disadvantages. If you type NEW, all your routines are lost and you have to ensure that those routines are appended to the end of every program which uses them.

The more interesting way is to delve into assembly language. QDOS supplies special routines to extend the interpreter's list of names it recognises and, by following a few simple conventions, you can easily add any routine you like. Once the new routines have been installed, they become part of the machine. NEW will not remove them, they do not need to be added to each program, and they are generally much smaller than their SuperBasic counterparts. The disadvantage is that you need an assembler.

To see how the technique is implemented

by adding a few useful procedures and functions, try adding two new procedures and six new functions:

```
CRSR #channel,switch
FOUNT #channel, fount1_addr,
fount2_addr
file_length=FLEN (#channel)
bytes_free=FREE
cur_x_pos=XPOS (#channel)
cur_y_pos=YPOS (#channel)
x_size=XSIZE (#channel)
y_size=YSIZE (#channel)
```

Look more closely at those routines to see what they do. CRSR switches the cursor on or off on a specified SCR_ or CON_ channel, depending on the value of the second parameter. If that is zero, the cursor is turned off; any other value will switch it on.

FOUNT allows you to set the addresses of the character sets used by each SCR_ or CON_ channel. If either of the addresses is zero, the ROM default fount is used for that fount. If you design your own character sets, you can load the founts into RAM using RESPR and then set up the addresses with this procedure. FLEN returns the length of an open file in bytes but the Microdrive device driver is written in such a way that FLEN can give a true value only if the file

SuperBasic has a large number of commands not found in other languages but it also has the power to extend itself further. In this machine code feature James Morrison shows you how.

has just been opened. FREE returns the approximate number of bytes of free memory in the machine, using a definition of free memory used by Tony Tebby, author of QDOS.

XPOS and YPOS return the current X and Y co-ordinates of the cursor on the specified channel, in terms of character positions.

XSIZE and YSIZE return the number of columns and number of rows respectively on a given channel.

Note that in all the routines where '#channel' is specified, the '#' is optional,

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LOC	OBJECT	STMT	SOURCE STATEMENT	LOC	OBJECT	STMT	SOURCE STATEMENT
		2				37	
		3	* Extensions to SuperBasic			38	RET.FP EQU 2
		4	* (C) Jim Morrison, Paris 1972	=0002		39	RET.INT EQU 3
		5		=0003		40	
		6	* Trap keys			41	RI.FLOAT EQU 8
		7		=0008		42	RI.ADD EQU \$A
=0000	8	MT.INF EQU 0		=000A		43	RI.MULT EQU \$E
=0047	9	FS.HEADR EQU \$47		=000E		44	
=000B	10	SD.CHEM EQU \$B		0000'	43FA 0008	45	START LEA.L PROC_DEF,A1
=000F	11	SD.CURS EQU \$F		0004'	347B 0110	46	MOVE.W BP.INIT,A2
=0025	12	SD.FOUNT EQU \$25		0008'	4ED2	47	JMP (A2)
	13					48	
	14	* Vectors		000A'	0002	49	PROC_DEF DC.W 2
=0110	16	BP.INIT EQU \$110				50	
=0118	17	CA.GTLIN EQU \$118		000C'	0094	51	DC.W CRS_PROC-*
=011A	18	BV.CHRIX EQU \$11A		000E'	04	52	DC.B 4
=011C	19	RI.EXEC EQU \$11C		000F'	4352 5352 00	53	DC.B 'CRSR',0
	20					54	
	21	* Error codes		0014'	00D2	55	DC.W FNT_PROC-*
	22			0016'	05	56	DC.B 5
=FFFA	23	ERR.NO EQU -6		0017'	464F 554E 54	57	DC.B 'FOUNT'
=FFF6	24	ERR.EF EQU -10				58	
=FFF1	25	ERR.BP EQU -15		001C'	0000	59	DC.W 0
	26			001E'	0006	60	DC.W 6
	27	* Various offsets and so on				61	
	28			0020'	0032	62	DC.W FN_FLEN-*
=000C	29	SV.FREE EQU \$C	From SV.BASE	0022'	04	63	DC.B 4
=0010	30	SV.BASIC EQU \$10	From SV.BASE	0023'	464C 454E 00	64	DC.B 'FLEN',0
	31					65	
=002B	32	CH.LENCH EQU \$2B		002B'	005E	66	DC.W FN_FREE-*
	33			002A'	04	67	DC.B 4
=0030	34	BV.CHBAS EQU \$30		002B'	4652 4545 00	68	DC.B 'FREE',0
=0034	35	BV.CHP EQU \$34				69	
=005B	36	BV.RIP EQU \$5B		0030'	00DA	70	DC.W FN_XPOS-*

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as you do not need to make any special checks for it.

Now to the code. The part which installs your routines into the interpreter name list begins at the label START. All you need to do is to put the address of a table containing the names and addresses of each routine into A1, and then call a QDOS vectored routine called BP.INIT. Once you have done that, your routines are installed permanently until you press RESET or switch off the machine.

The table, called PROC_DEF here, must be laid out in a particular way. The general form is:

- Word: Number of procedures
- then, for each procedure:
 - Word: Address of routine relative to here
 - Byte: Length of procedure name
 - Bytes: Characters of name
- rounded up to an even address
- Word: 0 (end of procedure list)
- Word: Number of functions
- then, for each function:
 - Word: Address of routine relative to here
 - Byte: Length of function name
 - Bytes: Characters of name
- rounded up to an even address
- Word: 0 (end of list)

If you look at PROC_DEF, you will see that it is in just that form. Following this table is the code for each individual routine; look at each one in turn.

FLEN. The first thing to do is call a QDOS routine CA.GTLIN, which gets any parameters passed to the routine as long integers — four bytes. If the routine cannot understand the arguments — if you pass a string like 'frog' to the routine, for example — it returns with the zero flag reset and DO holds an error code.

This subject will recur later. Check that the routine was passed only one parameter. After CA.GTLIN, D3 will hold the number

“If you pass a string like ‘frog’ to the routine, for example, it returns with the zero flag reset”

of parameters collected, so by subtracting one from D3, it will go zero only if one parameter had been passed.

If all is well, call a subroutine BAS_CHAN which appears later in the listing.

That gets the internal channel ID of the Basic channel which was passed as a number, usually preceded by '#'. The internal ID and the Basic number are different and QDOS knows only about the internal one.

If BAS_CHAN returns with the zero flag reset, the specified channel is not open, so you leave with an error. Otherwise you save A1 in A2 for a time and then call a QDOS routine FS.HEADR to read the file header into RAM.

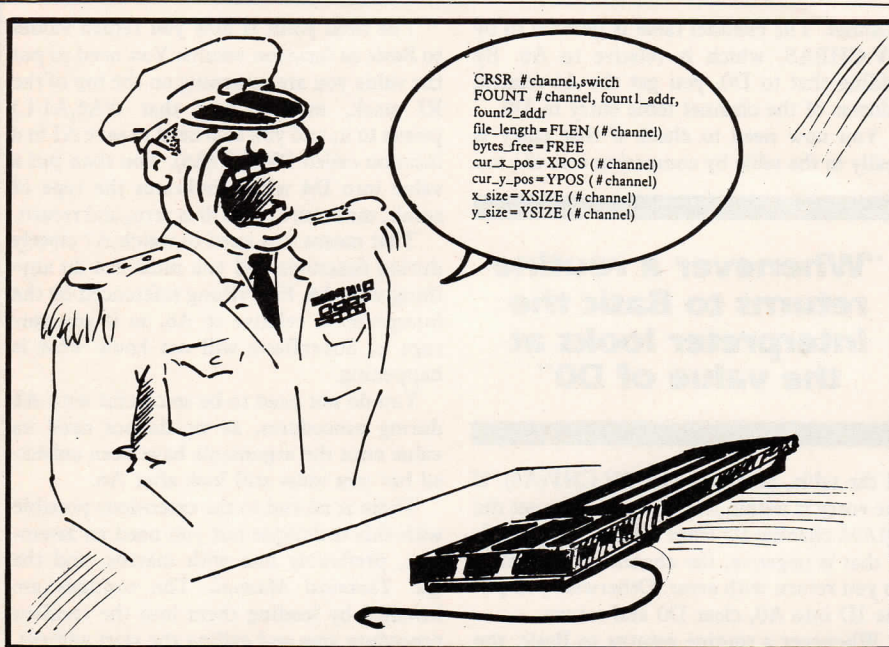
The first long word of the header holds the file length, so you extract that, put it into D4 and branch to a routine called FN_FP. That also appears further down the listing and converts the long integer in D4 to a floating point number, which it then returns to Basic as the result of the function.

FREE does not need to do too much. It calls a QDOS routine MT.INF to get the address of the system variables in A0. We then load the address of the Basic area into D4, subtract the address of the first free area and the length of a filing system slave block, and return the number left as the result of the function by jumping to FN_FP. Notice that you load A1 from a memory location BV.RIP(A6) before you jump to FN_FP. There is a very good reason for that, which

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LOC	OBJECT	STMT	SOURCE STATEMENT	LOC	OBJECT	STMT	SOURCE STATEMENT
0032'	04	71	DC.B 4	0076'	4A80	105	TST.L DO
0033'	5850 4F53 00	72	DC.B 'XPOS',0	0078'	660A	106	BNE.S READ_OUT
		73		007A'	224A	107	MOVEA.L A2,A1
0038'	00DC	74	DC.W FN_YPOS-*	007C'	2813	108	MOVE.L (A3),D4
003A'	04	75	DC.B 4	007E'	5889	109	ADDQ.L #4,A1
003B'	5950 4F53 00	76	DC.B 'YPOS',0	0080'	6000 00E0	110	BRA FN_FP
		77		0084'	4E75	111	READ_OUT RTS
0040'	00DE	78	DC.W FN_XSIZ-*			112	
0042'	05	79	DC.B 5			113	* A function to return the number of bytes of
0043'	5853 495A 45	80	DC.B 'XSIZE'			114	free memory. Approximately.
		81		0086'	7000	115	FN_FREE MOVEQ #MT.INF,DO
0048'	00DE	82	DC.W FN_YSIZ-*	0088'	4E41	116	TRAP #1
004A'	05	83	DC.B 5	008A'	2828 0010	117	MOVE.L SV.BASIC(A0),D4
004B'	5953 495A 45	84	DC.B 'YSIZE'	008E'	98A8 000C	118	SUB.L SV.FREE(A0),D4
		85		0092'	0484 0000 0200	119	SUBI.L #512,D4
0050'	0000	86	DC.W 0	0098'	226E 0058	120	MOVEA.L BV.RIP(A6),A1
		87		009C'	6000 00C4	121	BRA FN_FP
		88	* A function to return the length of			122	
		89	an open file			123	* Procedure to enable and disable a cursor on
0052'	3478 0118	90	FN_FLEN MOVE.W CA.GTLIN,A2	00A0'	3478 0118	124	a screen channel
0056'	4E92	91	JSR (A2)	00A4'	4E92	125	CRS_PROC MOVE.W CA.GTLIN,A2
0058'	662A	92	BNE.S READ_OUT	00A6'	661A	126	JSR (A2)
005A'	70F1	93	MOVEQ #ERR.BP,DO	00AA'	5543	127	BNE.S EXIT_CHN
005C'	5343	94	SUBQ.W #1,D3	00AB'	70F1	128	MOVEQ #ERR.BP,DO
005E'	6624	95	BNE.S READ_OUT	00AC'	6614	129	SUBQ.W #2,D3
0060'	6100 0062	96	BSR BAS_CHAN	00AE'	6114	130	BNE.S EXIT_CHN
0064'	661E	97	BNE.S READ_OUT	00B0'	6610	131	BSR.S BAS_CHAN
0066'	2449	98	MOVEA.L A1,A2	00B2'	5889	132	BNE.S EXIT_CHN
0068'	43FA 0178	99	LEA.L BUFFER,A1	00B4'	700F	133	ADDQ.L #4,A1
006C'	2649	100	MOVEA.L A1,A3	00B6'	2236 9800	134	MOVEQ #SD.CURS,DO
006E'	76FF	101	MOVEQ #-1,D3	00BA'	6702	135	MOVE.L 0(A6,A1.L),D1
0070'	7410	102	MOVEQ #16,D2	00BC'	5300	136	BEQ.S CUR_OFF
0072'	7047	103	MOVEQ #FS.HEADR,DO	00BE'	76FF	137	SUBQ.B #1,DO
0074'	4E43	104	TRAP #3			138	CUR_OFF MOVEQ #-1,D3

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will be examined in detail a little later.

CRSR checks that it has two parameters and then uses the first to extract the channel ID using BAS_CHAN. The value

SD.CURS is loaded into DO ready to disable the cursor when we execute a TRAP # 3 instruction. It then checks the value of the second parameter and if it is zero does the trap immediately. Otherwise it decre-

ments DO by 1, leaving it holding a value known as SD.CURE, which has the opposite effect to SD.CURS and enables rather than disables the screen cursor.

The FOUNT procedure has three parameters, the first of which is a Basic channel number, so you use BAS_CHAN to convert it into a QDOS channel ID and then move the second and third parameters into registers A1 and A2 ready for the SD.FOUNT trap, which sets up a channel's fount addresses.

XPOS, YPOS, XSIZE and YSIZE are all very similar, as they all have one parameter — a channel number — and all receive their information from the same routine, SD.CHENQ. That returns the window size and cursor position into a four-word block which was pointed to by A1 before the trap was executed. Each routine extracts the information it wants and returns that number as an integer to SuperBasic.

The FN_FP routine converts a four-byte unsigned value in D4 to a floating point number, which it then returns to Basic. It uses QDOS routines BV.CHRIX and RI.EXEC to do it, but is rather complicated. If you have the time, see if you can determine how it works.

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LOC	OBJECT	STMT	SOURCE STATEMENT	LOC	OBJECT	STMT	SOURCE STATEMENT
00C0'	4E43	139	TRAP #3	010B'	4E75	174	EXIT_FNT RTS
00C2'	4E75	140	EXIT_CHN RTS			175	
		141				176	* A function to return the current X-position
		142	* A subroutine to return the QDOS channel ID			177	of the cursor attached to a window
		143	of a Basic # channel	010A'	6124	178	FN_XPOS BSR.S POS_COM
00C4'	2036 9800	144	BAS_CHAN MOVE.L 0(A6,A1.L),DO	010C'	3DAA 0004 9800	179	MOVE.W 4(A2),0(A6,A1.L)
00C8'	722B	145	MOVEQ #CH.LENCH,D1	0112'	4E75	180	RTS
00CA'	C0C1	146	MULU D1,DO			181	
00CC'	DOAE 0030	147	ADD.L BV.CHBAS(A6),DO			182	* A function to return the current Y-position
00D0'	80AE 0034	148	CMP.L BV.CHP(A6),DO			183	of the cursor attached to a window
00D4'	640C	149	BCC.S BAD_CHAN	0114'	611A	184	FN_YPOS BSR.S POS_COM
00D6'	2036 0800	150	MOVE.L 0(A6,DO.L),DO	0116'	3DAA 0006 9800	185	MOVE.W 6(A2),0(A6,A1.L)
00DA'	6B06	151	BMI.S BAD_CHAN	011C'	4E75	186	RTS
00DC'	2040	152	MOVEA.L DO,A0			187	
00DE'	7000	153	MOVEQ #0,DO			188	* A function to return the character dimension
00E0'	4E75	154	RTS			189	of a window - X co-ordinate
00E2'	70FA	155	BAD_CHAN MOVEQ #ERR.NO,DO	011E'	6110	190	FN_XSIZ BSR.S POS_COM
00E4'	4E75	156	RTS	0120'	3D92 9800	191	MOVE.W (A2),0(A6,A1.L)
		157		0124'	4E75	192	RTS
		158	* Procedure to set the fount addresses for a			193	
		159	screen channel			194	* A function to return the character dimension
00E6'	347B 0118	160	FNT_PROC MOVE.W CA.GTLIN,A2			195	of a window - Y co-ordinate
00EA'	4E92	161	JSR (A2)	0126'	6108	196	FN_YSIZ BSR.S POS_COM
00EC'	661A	162	BNE.S EXIT_FNT	0128'	3DAA 0002 9800	197	MOVE.W 2(A2),0(A6,A1.L)
00EE'	70F1	163	MOVEQ #ERR.BP,DO	012E'	4E75	198	RTS
00F0'	5743	164	SUBQ.W #3,D3			199	
00F2'	6614	165	BNE.S EXIT_FNT			200	* Common code for FN_YPOS, FN_XPOS FN_XSIZ and
00F4'	61CE	166	BSR.S BAS_CHAN			201	FN_YSIZ
00F6'	6610	167	BNE.S EXIT_FNT	0130'	347B 0118	202	POS_COM MOVE.W CA.GTLIN,A2
00F8'	2476 9808	168	MOVE.L 8(A6,A1.L),A2	0134'	4E92	203	JSR (A2)
00FC'	2676 9804	169	MOVE.L 4(A6,A1.L),A3	0136'	6626	204	BNE.S EXIT_PCOM
0100'	224B	170	MOVEA.L A3,A1	0138'	70F1	205	MOVEQ #ERR.BP,DO
0102'	76FF	171	MOVEQ #-1,D3	013A'	5343	206	SUBQ.W #1,D3
0104'	7025	172	MOVEQ #SD.FOUNT,DO	013C'	6620	207	BNE.S EXIT_PCOM
0106'	4E43	173	TRAP #3	013E'	6100 FF84	208	BSR BAS_CHAN

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BAS_CHAN. When parameters to routines are collected by CA.GTLIN and a few other routines they are put on to something called the RI Stack, an area of memory which is reasonably similar to a machine stack except that it moves about a good deal and is owned entirely by the SuperBasic interpreter. A1 is used as the stack pointer for this area, which is why you have been so careful with that register in all your routines. As the RI stack moves around, A1 is relative to A6, which means that each time you access the stack you must do so relative to A6.

If you collected three arguments to a routine with CA.GTLIN, you could find the value of the first from

```
0(A6,A1.L)
the second from
4(A6,A1.L)
and the third from
8(A6,A1.L)
```

That is what you do in BAS_CHAN. You get the value of the first parameter into D0. You then put the length of each Basic channel table entry into D1 and multiply the two, which leaves you with the offset into the beginning of the channel table of your

channel. The channel table is pointed to by BV.CHBAS, which is relative to A6. By adding that to D0, you get the A6-relative address of the channel table entry in D0.

You now need to check if that entry is really in the table by comparing it to the top

“Whenever a routine returns to Basic the interpreter looks at the value of D0”

of the table, pointed to by BV.CHP(A6). If the entry is within the table, you can get the QDOS channel ID from the first long word. If that is negative, the channel is not valid, so you return with error. Otherwise you put the ID into A0, clear D0 and return.

Whenever a routine returns to Basic, the interpreter looks at the value of D0. If it is not zero, an error is considered to have occurred, so the program stops and reports the error. By putting values into D0 you can generate your own errors.

The final point is how you return values to Basic as function results. You need to put the value you are returning on the top of the RI stack, making sure that 0(A6,A1.L) points to it, and you also need to save A1 in a location called BV.RIP(A6). You then put a value into D4 which indicates the type of result, make sure that D0 is zero, and return.

That means you need to watch A1 closely during functions and you must not do anything with A6. Everything referenced by the interpreter is relative to A6, so if you corrupt it, SuperBasic will not know what is happening.

You do not need to be so careful with A1 during procedures, as we do not need its value once the arguments have been collected but you must still look after A6.

There is no end to the extensions possible with this technique but you need an assembler, preferably one with macros, and the *QL Technical Manual*. The routines are installed by loading them into the resident procedure area and calling the start address, like this:

```
a=respr (500)
Lbytes mdv1_code.file, a
call a
new
```

LOC	OBJECT	STMT	SOURCE STATEMENT	LOC	OBJECT	STMT	SOURCE STATEMENT
0142'	661A	209	BNE.S EXIT_PCOM	0190'	2DBC 1000 0000 9802	242	MOVE.L ##10000000,2(A6,A1.L)
0144'	2849	210	MOVEA.L A1,A4	0198'	700A	243	MOVEQ #R1.ADD,D0
0146'	45FA 009A	211	LEA.L BUFFER,A2	019A'	4E92	244	JSR (A2)
014A'	224A	212	MOVEA.L A2,A1	019C'	5D89	245 NOSIGN	SUBQ.L #6,A1
014C'	76FF	213	MOVEQ #-1,D3	019E'	3DBC 0813 9800	246	MOVE.W ##813,0(A6,A1.L)
014E'	700B	214	MOVEQ #SD.CHENQ,D0	01A4'	2DBC 1000 0000 9802	247	MOVE.L ##10000000,2(A6,A1.L)
0150'	4E43	215	TRAP #3	01AC'	700E	248	MOVEQ #R1.MULT,D0
0152'	224C	216	MOVEA.L A4,A1	01AE'	4E92	249	JSR (A2)
0154'	5489	217	ADDQ.L #2,A1	01B0'	4844	250	SWAP D4
0156'	7803	218	MOVEQ #RET.INT,D4	01B2'	3A04	251	MOVE.W D4,D5
0158'	2D49 0058	219	MOVE.L A1,BV.RIP(A6)	01B4'	5589	252	SUBQ.L #2,A1
015C'	4E75	220	RTS	01B6'	3D84 9800	253	MOVE.W D4,0(A6,A1.L)
015E'	588F	221	EXIT_PCOM ADDQ.L #4,A7	01BA'	7008	254	MOVEQ #R1.FLOAT,D0
				01BC'	4E92	255	JSR (A2)
0160'	4E75	222	RTS	01BE'	4A45	256	TST.W D5
		223		01C0'	6A14	257	BPL.S POSNUM
		224	* An end-of-function routine to return the long	01C2'	5D89	258	SUBQ.L #6,A1
		225	int in D4 as FPNUM to Basic	01C4'	3DBC 0813 9800	259	MOVE.W ##813,0(A6,A1.L)
0162'	2D49 0058	226 FN_FP	MOVE.L A1,BV.RIP(A6)	01CA'	2DBC 1000 0000 9802	260	MOVE.L ##10000000,2(A6,A1.L)
0166'	7212	227	MOVEQ #18,D1	01D2'	700A	261	MOVEQ #R1.ADD,D0
0168'	3478 011A	228	MOVE.W BV.CHRIX,A2	01D4'	4E92	262	JSR (A2)
016C'	4E92	229	JSR (A2)	01D6'	700A	263 POSNUM	MOVEQ #R1.ADD,D0
016E'	226E 0058	230	MOVE.L BV.RIP(A6),A1	01D8'	4E92	264	JSR (A2)
0172'	5589	231	SUBQ.L #2,A1	01DA'	2D49 0058	265	MOVE.L A1,BV.RIP(A6)
0174'	4844	232	SWAP D4	01DE'	7802	266	MOVEQ #RET.FP,D4
0176'	3A04	233	MOVE.W D4,D5	01E0'	4E75	267	RTS
0178'	3D84 9800	234	MOVE.W D4,0(A6,A1.L)			268	
017C'	7008	235	MOVEQ #R1.FLOAT,D0	01E2'	=0010	269 BUFFER	DS.B 16
017E'	3478 011C	236	MOVE.W RI.EXEC,A2			270	
0182'	4E92	237	JSR (A2)			271	END
0184'	4A45	238	TST.W D5				
0186'	6A14	239	BPL.S NOSIGN				
0188'	5D89	240	SUBQ.L #6,A1				
018A'	3DBC 0813 9800	241	MOVE.W ##813,0(A6,A1.L)				

No errors found in this Assembly

H O M E FINANCE

Keeping books with the QL

HOME FINANCES are usually masses of paper relegated to boxes in cupboards and are about as much fun as figuring your tax return. Even if you are sufficiently organised to list your finances on the back of a restaurant napkin, that does not mean you can analyse them to any degree. You will find that the calculator batteries will always be flat and that a spot of chicken biryani will look very much like the number 400 in a dim light.

So when a QL computer program selling for £24.95 says it cannot only list and calculate your income and outgoings, but also analyse and update your personal accounts, it seems to be an answer from heaven — well, Oxford.

Buzz Software *Home Finance* is that program. It offers automatic updating of your account balances whenever you enter any new information. Standing orders can also be calculated to appear automatically as a debit in your account.

It also offers an analysis feature which reviews your income and expenditure by a variety of parameters, including the type of account, description of item, type of expense or even who it is in your family who keeps incurring the bills at the local taxidermy shop.

Home Finance is adaptable to two types of book-keeping systems, single- or double-entry. A single-entry system limits you to three accounts, which usually would be a bank account, a building society mortgage account and a building society savings account. It is directly through those accounts

that your debits and credits are accounted.

A double-entry book-keeping system changes all your debtors and creditors into accounts — and that includes your bank accounts — and therefore every transaction will create a credit in one account with a debit in another.

Entering and starting accounts in Home Finance is simple. It is not one of those programs which purports to help you in a task and then proves to be so immensely complicated that the entire purpose of the program is negated.

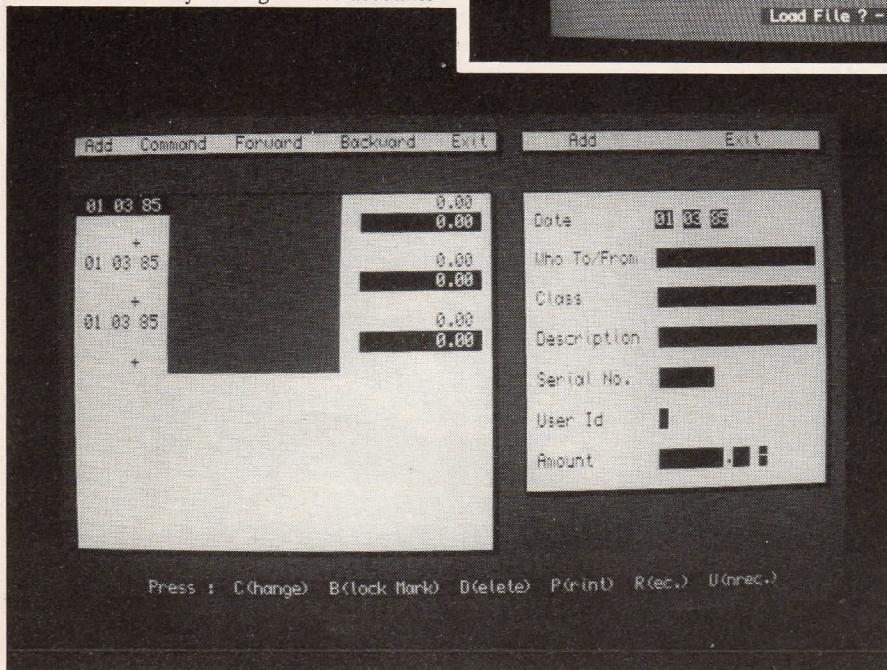
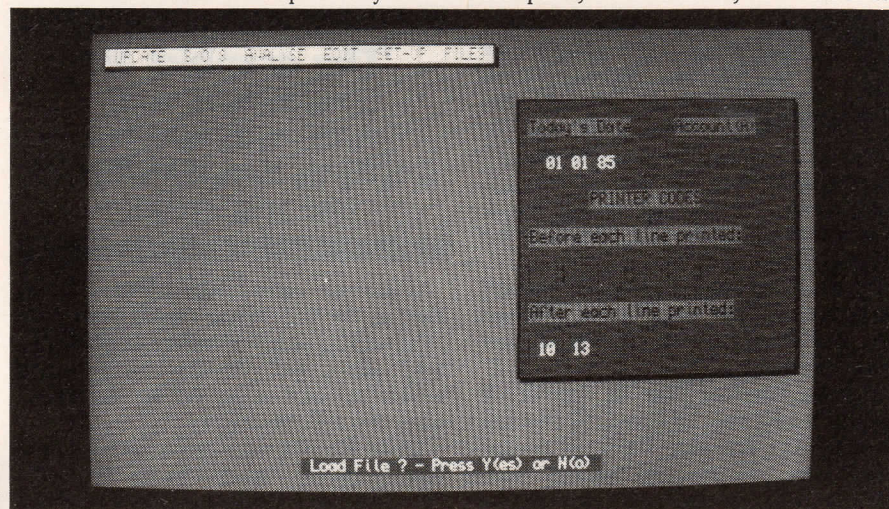
The main commands, such as Update or Analyse — which appear along the top of the screen — are self-explanatory. Using the cursor keys, you highlight your choice, then press Enter. Depending on your choice, another menu or window will appear.

To open a bank account, choose Update from the command menu and press Enter. The account window will open for you to

'Home Finance is adaptable to two types of book-keeping systems, single- or double-entry.'

type-in your account name. Press Enter again and a blank statement window appears on the left of the screen. Highlighting Add on the command menu, then pressing Enter, causes the account window to be replaced by the transaction window.

The transaction window allows you to list some details about your transaction, such as the date, the source of the money, class, description, serial number, user identifica-



tion and amount. After all the information has been entered, you highlight the Add on command menu, then Enter. The details will then appear in the statement window.

Another feature of the transaction window is field scrolling. The data entered in the fields of Who To/From, Class and Description is stored in memory and may be called-up by keying F1 or F2. F1 scrolls your data backwards alphabetically while F2 scrolls your data forwards alphabetically. So if you have already used a particular field previously, rather than typing it in again, use these two function keys to find the text you are seeking.

Transactions can also be modified in a variety of ways. Accounts may be deleted, changed or even marked as reconciled, if your figures tally with those of the bank. The C(hange) key is of interest because it can be used in two ways; you can either use an old transaction again or create a new

continued on next page

continued from previous page

transaction by using the old one as a model.

Home Finance will also deal with standing orders, updating your accounts automatically as the orders become effective. Three types of S/Os are allowed; same day each month — e.g., the 15th of each month — the last day of each month or yearly. The data for standing orders is keyed into a Standing Order window which is similar to the transaction window.

Putting all your financial information into a computer is ineffective unless it is combined with sorting and analysing features. One obvious feature Home Finance provides is easily-obtainable account balances.

It can look at your figures according to class, description, debtor or creditor, account identification, or standing orders. You have to decide whether you want all or only one type of analysis. That analysis will appear with all the negative amounts first, followed by all the positive amounts. There is, however, an option to view your information only in the negative form or only in the positive.

There is also an Edit command, which allows you to change or merge your existing categories. You can also allocate a group number for a particular category for easy sorting.

For those who are sufficiently concerned about their personal finances to want to put them in some kind of order and be able to gain some knowledge from that, Home Finance may be the answer. It not only helps you reconcile your books, but also gives you a reasonably good breakdown of where you are spending your money.

There are, of course, some people who are not interested in studying the variety of ways they have spent money. For them it suffices that they have spent it.

QL Home Finance, Sinclair Research, 25 Willis Road, Cambridge CB1 2AQ. — Yvette Stachowiak.

Silicon spellunking

QL Cavern is the first major arcade game released for the QL. Although there have been some published in listings books, and the odd one is advertised in the small advertisements at the back of certain magazines, *QL Cavern* marks the first high-quality arcade game to take advantage of the power of the machine.

It was written by Janko Mrcic-Flogel and represents the type of advanced machine code game developed only recently on other home computers.

The objective is to guide BJ — don't ask what it stands for — round 50 caverns collecting 395 diamonds from the various rooms, while avoiding inevitable death from the very odd monsters and other deadly obstacles.

I was impressed at first with the use of the four cursor-control keys to move BJ round the screen but it needed some time, and several deaths, before I could recognise the deadly objects and avoid them.

The graphics are excellent and demonstrate the exciting capabilities of the machine but I was glad to be able to turn off the sound since it was disappointing and sometimes just damned annoying.

The introductory pages are well-presented, allowing a simple selection between Briefing, Instructions, a Demonstration and the Game. As usual, in my eagerness I began by playing the game until frustration compelled me to read the instructions, which thankfully were brief and to the point.

An unusual feature is that there are no obscene characters constantly chasing you, so the game may be taken at a leisurely pace, with an occasional dash for safety when in danger.

'The graphics are excellent and demonstrate the exciting capabilities of the machine.'

There are some really pleasant items, such as the trampolines which bounce BJ progressively upwards until he can land on a ledge above, and the lifts and detonators used to move between levels on each screen when there are no stairs.

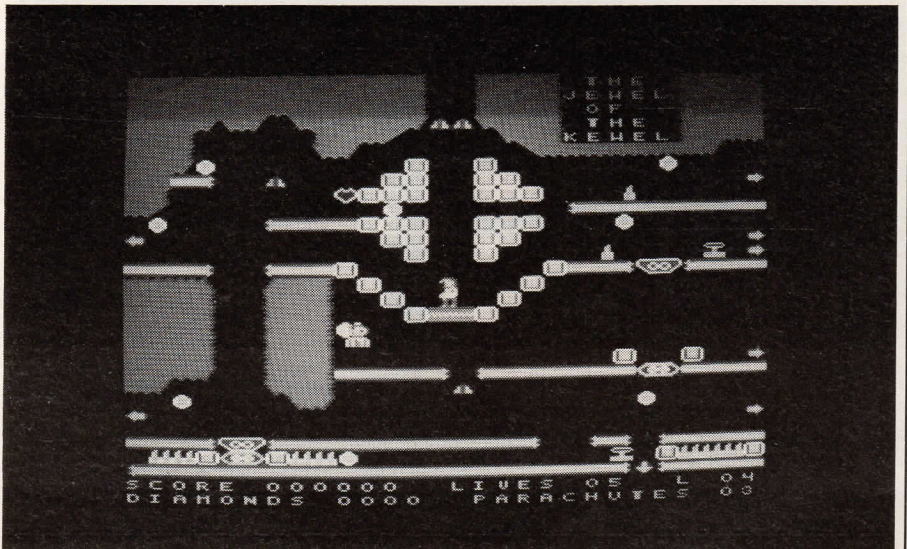
Other features are jet-packs, which allow BJ to be flown, somewhat erratically, round the cavern, and parachutes which save him if he falls. As for extra lives, they are readily available in the form of hearts — at one stage

I had 27 — and are just as easily lost again.

There are several routes off each screen, marked with arrows, while the teleport is used to reach otherwise inaccessible parts of the caverns. No special routines are needed to use the game with a joystick as the QL joystick port treats joystick input, from control port 1, the same as cursor key input.

The game should become a classic and is more than a match for the *Manic Miner*-type games which became popular on the Spectrums and 64s of yesteryear. *QL Cavern* costs £12.95 and is available from Sinclair Research, 25 Willis Road, Cambridge CB1 2AO — Jason Ball.

Rating	
Playability	* * * * *
Graphics	* * * * *
Addictiveness	* * * * *
Documentation	* * * * *
Overall value	* * * * *



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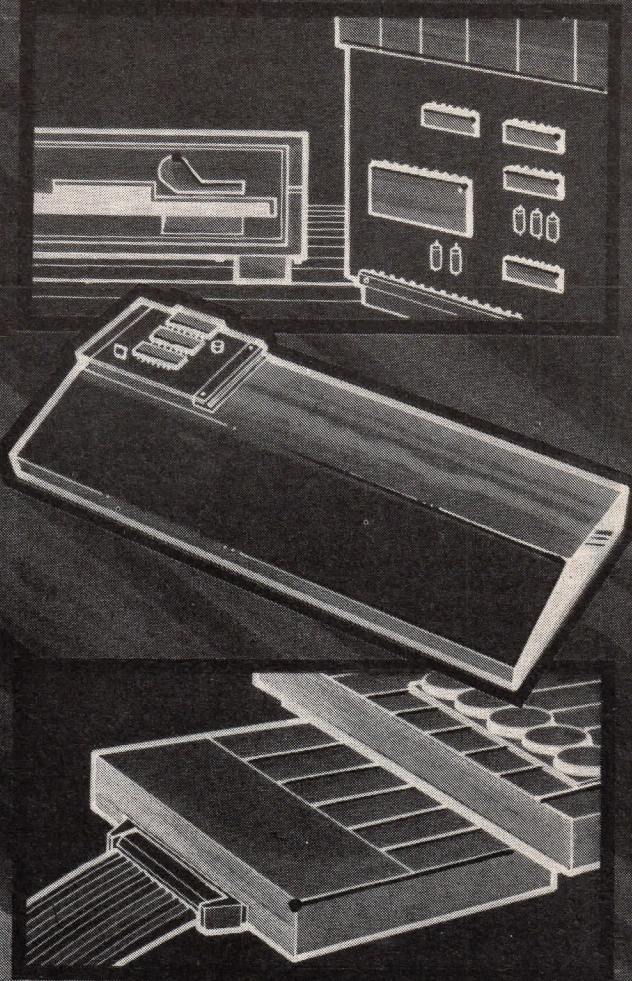
QL Future Growth

New horizons for your microcomputer from CAMBRIDGE SYSTEMS TECHNOLOGY, the dedicated specialists in expansion peripherals for the Sinclair QL.

CST who were the first on the market with a disc drive controller, a Centronics port and a fully operational IEEE-488 interface, now offer the Q+4 multi-way expansion module. With four fully-buffered ports, the Q+4 is fully compatible with QL add-ons and features a controller ROM functioning with any version of the QL operating system. Built into a rugged matching case, the Q+4 is designed to sit beneath the computer.

The CST Q-disc is the first controller to allow standard disc drives to be connected to the Sinclair QL, via the QL expansion port. The Q-disc offers extensive file handling and random access facilities plus an essential utility disc and a comprehensive manual.

The Q-488 is a fully implemented IEEE-488 interface which permits the Sinclair QL to communicate with scientific and industrial equipment offering extensive help facilities plus comprehensive error checking.



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Every editor needs a postbag — but ours at present is empty. Please help by writing to us at the address below before the editor suffers a major crisis of confidence and starts taking it out on the staff. To prevent this insidious form of mental illness, please write to Letters Page, The Editor, QL World, Wells House, 80-82 Upper Street, London N1 0NU.

User club sought

I BOUGHT a QL in September, 1984 and have been relatively satisfied with the machine. The manual for the machine, however, is not very explanatory and sometimes downright confusing. I have noticed because of the shortcomings of the documentation that I cannot use my QL to the extent I should be able to do.

Even though I have had a small amount of computing experience, I am becoming very frustrated with not being able to solve what must be fairly simple problems. *QLUB News* has been of some help to me but it cannot possibly answer all of my minor questions.

Why is there not a QL Users' Club in Putney for lost souls like myself who would benefit from being able to exchange information and software? Or is everyone so satisfied with their QL that this is a vain appeal?

**Alexander Proudfoot,
Putney, London.**

● *We are not sure about the existence of any QL clubs in your part of the world but we can direct you to someone who can help. Write to Leon Heller of the Independent QL Users' Group, c/o of this magazine. Heller writes a regular column for us — Inside IQLUG — and could be helpful to you.*

The spell of the QL

I AM WRITING to ask advice on which computer in the £600 price range is the most suitable for my needs. I run a small florist's shop and, after years of struggling with my cash books, I have decided to make the great technological leap forward.

I have narrowed my choice to the Amstrad, the ACT Apricot and the QL. I had considered the BBC because of the amount of software available but it really is not comparable as a business machine.

The new Amstrad CPC 664 caught my eye because of its price. I can buy one for £440 with a colour monitor. For that, I get a built-in disc drive, CP/M and an 80-column screen. It also has a numeric keypad and easy-to-use cursor keys but I am a little concerned about the 3in. discs the Amstrad uses, because most CP/M programs are on 5in. discs. Also, the 64K memory does not

compare all that favourably to the Apricot and the QL.

The ACT Apricot F1, which would cause a bigger dent in my pocketbook at £595, has 256K memory which is expandable. In fact, one of the bonuses of the Apricot seems to be that the entire machine is fairly flexible with many options if I feel the need. The infra-red system for the keyboard and optional mouse, however, seems to be prone to interference and a bit too gadgety.

The QL offers two disc drives, though they are relatively microscopic in size, 128K worth of memory and very little else. The range of peripherals which may be added seems to be fairly limited and the number of expansion ports on the rear of the machine seem to limit it to Sinclair's little productions. Finally, there appears — or does not appear — to be a great deal of software available for the QL, despite its presence on the market for more than a year. Any help in this matter would be greatly appreciated.

**S Kingston,
London.**

● *Choosing a micro is a very individual activity — and has more to do with your own needs and requirements than with floppy discs, monitors and prices.*

If you want a professional microcomputer to use at home, you could do a good deal worse than the QL. As you know, the machine is accompanied by four pieces of business software and provides connections for printers, monitors and disc drives. The QL commends itself with two Microdrive storage units, which are admittedly not as standard or as high-capacity as disc drives, but they are built into the basic price of the machine and there are two of them.

While it does not use the MS-DOS operating system like the Apricot or the CP/M system used in the Amstrad machine, the QL has a growing range of business software available in its Qdos format — and it is usually a good deal cheaper than what you would pay, for example, if you bought similar software for the Apricot.

BBC to QL and back?

AS THE PROUD owner of a BBC micro, regrettably I have reached the conclusion that the Sinclair QL is more suitable for my business, since it has a bigger memory and behaves more like a business machine.

I would, however, like to confirm a few points before I become £400 out of pocket. First, I have several hundred files for the BBC View word processor, which I

would want to convert to the QL to avoid the performance of setting up the BBC to read them. Is that possible and how complicated would it be?

Second, if I set up the BBC at home, will I be able to transfer information from the QL to the BBC, and vice-versa, both over the telephone line and on disc? Third, is it possible to use my BBC disc drives with the QL if I buy the disc interface, and how does one power them using the QL — I am not prepared to plug in the BBC just to provide the power for the drives.

**A N Aminiut,
Surrey.**

● *Dealing with your first point first, it is possible to transfer your View files from the BBC to the QL — although it would take you some time. You could do it by connecting the BBC to the QL via the serial ports on the machines (serl on the QL and the RS-423 port on the BBC) and using a terminal program on the BBC to send text to export files on the QL, which could then be imported into Quill for reading and editing.*

As for the second point, again the transfer of information from QL to BBC over the telephone would be possible, providing you had an auto-answer modem and appropriate software at the BBC end and, of course, a modem at the QL end.

It might make more sense, however, to register with an electronic mail service and use the QL to send any text you need to transfer first to your mailbox, which you could then download on to the BBC when you get home.

You can use your BBC disc drives with almost any QL disc interface, although you may have to buy a separate power supply for the disc drive — that should be available from any good BBC stockist. As for RAM boards and disc interfaces, you can use them together if you get an expansion card or cage.

Joysticks

I would like to use the QL for writing some games with joysticks but I have no joystick port in my games. How do I crack this one?

Joyless and Joystickless

The QL control or—joystick—ports do not have to be addressed directly in any program for you to use them.

Control port 1 gives the same values for FIRE, UP, DOWN, LEFT and RIGHT as for SPACE BAR, UP ARROW, DOWN ARROW, LEFT ARROW and RIGHT ARROW on the keyboard while Control port 2 gives the same five values for the fire button and four directions as are generated by the five function keys.

Express offering fits neatly inside QL

Interface and drive system incorporates the best features from each of the previous systems.

THE SILICON Express QL disc drive interface and drive system is the latest in the recent spate of such devices for the QL and incorporates the best features from each of the previous systems. It is the smallest of the disc interfaces we have seen to date and fits neatly inside the QL in such a way that it does not add to the length of the machine.

Like most of the other QL disc interfaces, the Silicon Express offering is a tight fit. We tried it in three QLs and found it would fit easily in two of them; the third required the QL being taken apart to fit in the board. That is somewhat inadvisable, however, as it would invalidate your warranty; note to Silicon Express — perhaps the board could be made a little narrower.

Other than the initial difficulty in fitting the board inside one of the QLs, installation was simple and fast. The cable between the disc interface and drives clicks in place and both QL and drives are then ready to power-up.

There is a choice of disc drives, including both the popular 5.25in. and 3.5in. formats, with each drive offering a maximum of 720K storage formatted. Our test system was a twin-floppy 5.25in. system which offered 1.4MB of storage, about seven times what we were able to get previously on the two Microdrives combined. The disc drives have their own separate plug and power supply and must be powered-up before the QL.

As the system is tied so closely to the Sinclair Microdrive operating system Qdos, there is not a great deal to document in the Silicon Express package, which probably explains why the documentation is a relatively slim volume.

There might perhaps have been some advantage in explaining general disc drive operations in more detail but that would have added to the cost of the system and thus removed one of the chief attractions of it. All the day-to-day disc operations are covered in the manual and if you need more information than is provided, a number of books on file-handling and disc drive management are available.

Having used both the CST disc interface and one offered by Micro Peripherals, we did not need to look at the documentation. That is perhaps because the Silicon Express

system acts like both of the two earlier systems put together.

The disc system can be used in one of two modes — either as the third and fourth storage devices (flp1_ and flp2_) which work in conjunction with the Microdrives or simply as Microdrive replacements (mdv1_ and mdv2_). The system starts up with the QL thinking of the disc drives as devices in addition to the Microdrives, giving you access to flp1_, flp2_, mdv1_ and mdv2_.

To use the Psion software — or any other software, for that matter — with the flp_ designation, you first have to convert your existing software to recognise flp_ as a valid device. That is accomplished using a conversion routine with the package, which rewrites every mdv_ reference as flp_, even in machine code programs such as Psion Version 2 software. Once the program has been converted, and thus transferred to disc, you can, for example, run Quill from the disc drive but still save documents to both Microdrives and floppies.

The alternative is to use the disc drives as Microdrives, as Micro Peripherals does with its interface. That means that you fool the operating system into thinking the disc drives are Microdrives.

In that mode, you do not have to convert Microdrive software to move it to disc drives — just copy it file by file or use a modified clone program — and you can stay with the 'mdv' syntax to which you will by now have become accustomed.

The second mode will not, however, allow you access to the Microdrives as you have already told Qdos that the floppies are now mdv1_ and mdv2_. By shifting back to flp_ mode you can easily copy disc files to Microdrive and vice versa using ordinary QDOS commands.

The Silicon Express system is competitively-priced and works well with the QL. It offers both the modes of operation provided by the other two popular disc interface systems — CST and Micro Peripherals — and can read files written to disc using the Micro Peripherals disc interface system. This system has to be considered seriously by anyone planning to buy discs to use with the QL.

Name: Silicon Express Insider disc interface and drives.

Manufacturer: Silicon Express Ltd, Silicon House, Fowke Street, Rothley, Leics.

Price: £99 for interface, £249 for single drive and interface, £399 for dual drive and interface.



Out of wilderness

AFTER more than a year in the communications wilderness, the QL is now able to use modems and communications software. The first offerings are from Modem House, which sells the highly-successful VTX5000 modem for the Spectrum, and Tandata, which has taken the modem offered originally by OE Ltd before it ran into financial problems.

Both systems permit access to the Prestel computer information database as well as connection to bulletin board and electronic mail services.

Before getting into the nitty-gritty of these systems, however, it is worth having some background about exactly what services you would be able to use if you bought a modem-communications package.

- *Electronic mail services.* Electronic mail systems allow computer users to send each other messages written using their computers and then stored on a central dial-up computer. The messages usually are written on a computer word processor or with an off-line editor and transmitted over the telephone line to a central computer system.

When messages are transmitted, you give a special code or address designating the name of the person to whom you are sending the message. The central computer then saves your message in a special area which can be read only by the addressee when next telephoning the central computer. Your recipients do not need to have QLs; they can use any computer with a modem and communications software to read and answer your message.

The only real disadvantage is that you have to telephone the system every day to check for your messages but it is no more arduous a task than walking to the door to check your regular mail.

- *Bulletin boards* are a form of electronic CB radio which permit anybody and everybody with a computer and modem to dial a central computer and leave messages on a commonly-read bulletin-board or send limited electronic messages to other members of the bulletin boards. The systems are usually run by private individuals rather than companies, use small business micros as the central computer and are difficult to contact — but a great deal of fun when you manage to do so.

Some bulletin boards require you to pay a small annual membership fee, although it is usually no more than a few pounds. Not many bulletin boards are open for more than a few hours of the day — you could hear a human voice from your modem if you

decide to telephone at the wrong hour.

- *Electronic magazines.* The best examples are on the BT-run Prestel communications service. An area of the vast Prestel system is set aside exclusively for those interested in micros and features the Micronet 800 and Viewfax 258 electronic magazines. Micronet is the biggest and it offers news, reviews, software, hints and tips, as well as advertisements for many new products.

Micronet also has a special information area for QL users known as QNET, although the present size of QNET has been restricted by the lack of modems for the QL.

If you subscribe to an electronic magazine such as Micronet, the rest of Prestel is also available to you. It includes everything from aircraft departure times to hotel-booking facilities, daily currency rates, news, train time-tables, theatre bookings and other essential titbits.

Prestel scores over many other information systems because it offers both colour and graphic displays, so that diagrams and

● In the next issue we will feature a full-blown head-to-head comparative review of the two systems which were just being completed as we went to press.

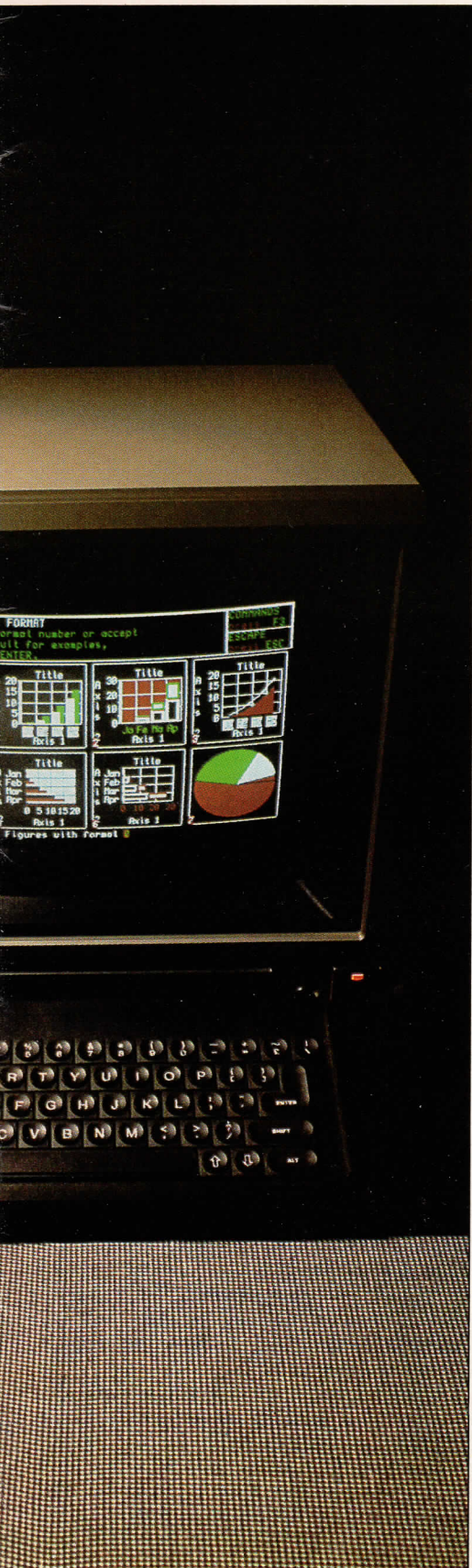
illustrations, albeit in a somewhat building-block style, can be sent over the telephone line. It does, however, use a strange method of information transmission, sending information to your screen at the relatively fast rate of 1,200 bits per second, but sending it back to the central Prestel computer at the slower rate of 75 bits per second.

To get into any of these systems, you need a modem and communications software. The two modems on offer allow access to Prestel but not necessarily to all bulletin boards and electronic information services.

Both systems use hard-wired modem technology, which relies on plugging the modem directly into a BT jack socket, as opposed to acoustic modem technology which relies on placing the telephone mouthpieces and earpieces into couplers.

What makes or breaks any communication system, however, is the software running on your QL. It should allow for a variety of baud rates, be crash-proof so that if there is a difficulty with incoming information your computer does not hang-up, and be relatively easy to understand and use.

If the modem offers an auto-dial facility, which allows the modem to dial a pre-selected telephone number automatically for you, the software ideally should also offer some form of electronic telephone book.



As the QL is a complex and sometimes idiosyncratic machine, it can often take a good deal of thought and understanding to get the most from it. That understanding is sometimes aided by reading books about the machine. To help choose between the classic and the less worthwhile, QL Bookworld will look in-depth at new books in each issue. We start with a review of the new Century book on Archive.

Q *L Archive* by Ian Murray, Blueprint, Century Communications, £6.95, is a detailed guide to the program of the same name which is, of course, provided by Psion with the QL. The book also acts as a reference work to using databases in general, providing 356 pages of extensive explanation, as opposed to the rather salutary 54-page synopsis in the manual.

While the QL manual provides a good introduction to Quill, it must be followed closely, since it is only a summary of the program and does not teach one how to use it. It is also complicated by the fact that Archive is by far the most complex and difficult of the Psion programs, although it is arguably the most powerful.

This book overcomes the problem by starting with the essentials and then moving through to the most complex facilities, all the time providing useful hints and ideas. Written with help from Charles Davies of Psion, the author of Archive, the book avoids simply repeating what is in the manual and expands on it considerably.

QL Archive is much more than a software

The QL Archive book uses illustrations by Sunday Times cartoonist Derek Adler to illuminate difficult concepts.



users' guide. It also gives advice on the computer as a whole, with clear drawings and easy-to-follow steps which take you through the format of the program, before demonstrating its use with example files.

It then explains multiple files, functions and procedures, loops, listening, printing, selecting and sorting, as well as more obscure functions such as screen design, building from old files, paging and totalling.

Despite its length the book is very readable and has easily-followed instructions, with no use of jargon. It offers a series of cartoons, handily-placed when the text is complicated and you are in need of some light relief, and well-considered appendices and index, so making it a useful reference source. For any serious user of the Archive database program, with so little information on its applications in the manual, this book is essential. — *Jason Ball.*

'No tears' programming from the Cryers

THE LATEST book from Neil and Pat Cryer — *Basic Programming on the QL* — Prentice/Hall International, £7.95 — is designed for the complete novice who may never have programmed a computer and simply teaches you how to write programs using the QL Basic language.

Programmers with experience on other micros should begin reading after the first two chapters, while those with a sound knowledge of the QL will find useful pages towards the end of the book.

It is written in much the same style as the authors' earlier best-seller, *Basic Programming on the BBC Micro*, and tends to resemble an educational textbook, with instructions, activities and discussions.

The instructions are clear, with excellent illustrations accompanying them, and while the QL manual provides an essential reference source, the book is equally valuable in its teaching capacity.

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BOOK

BASIC Programming on the

QL

Neil Cryer and Pat Cryer

The book begins with the set-up of the QL, before moving on to the creation of simple programs. It then covers saving and loading of programs before looking closely at QL SuperBasic.

Data, decisions, sound and windows each have chapters devoted to them, as do graphics and colour; and later in the book, which becomes rapidly more complex, there are sections on tables, functions, strings and files, preceding a final short look at structured programming.

Programs are used throughout to aid the understanding of Basic and provide useful examples, including one interesting game of strategy listed at the end.

Bearing in mind the price, it is worth buying if you seriously want to learn to program the machine, while avoiding the technical aspects of the manual. For further applications, however, most of the applications covered in the book are treated in considerably greater detail by other publications. — *Jason Ball.*

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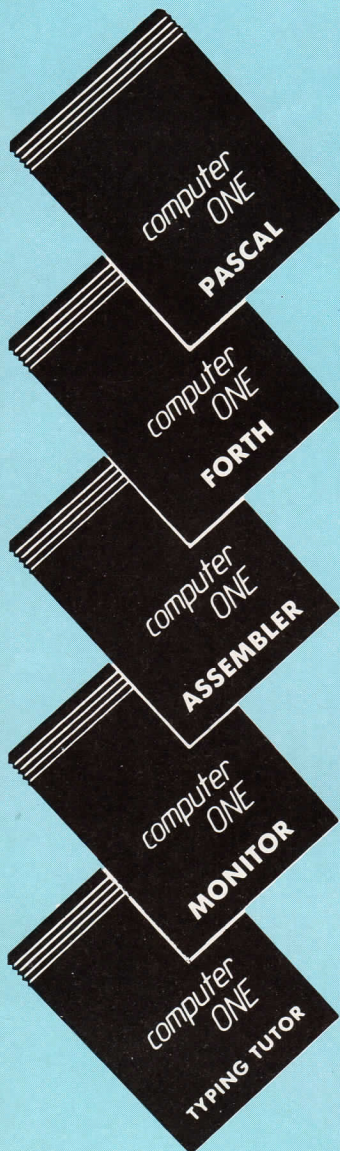
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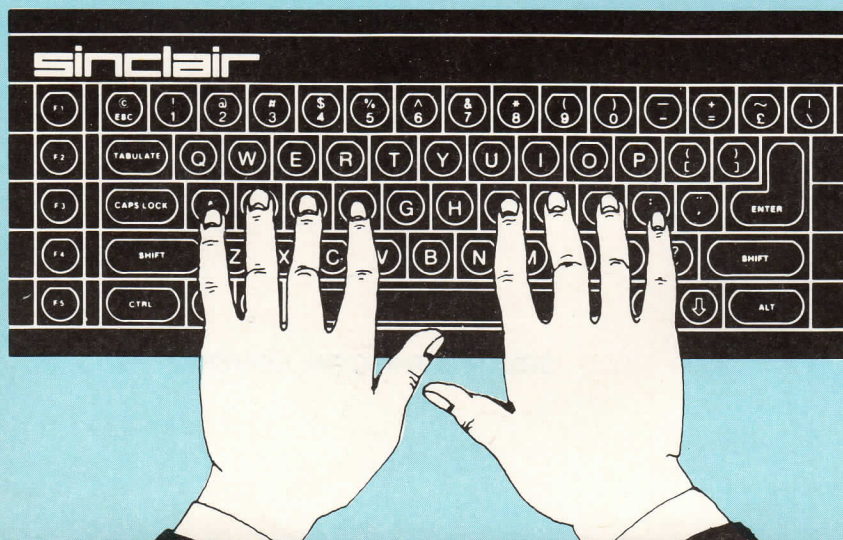


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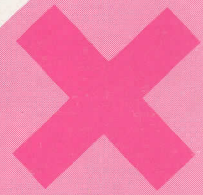
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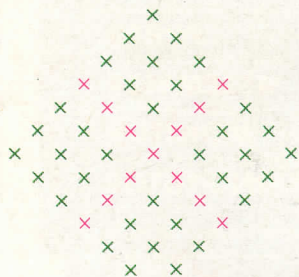
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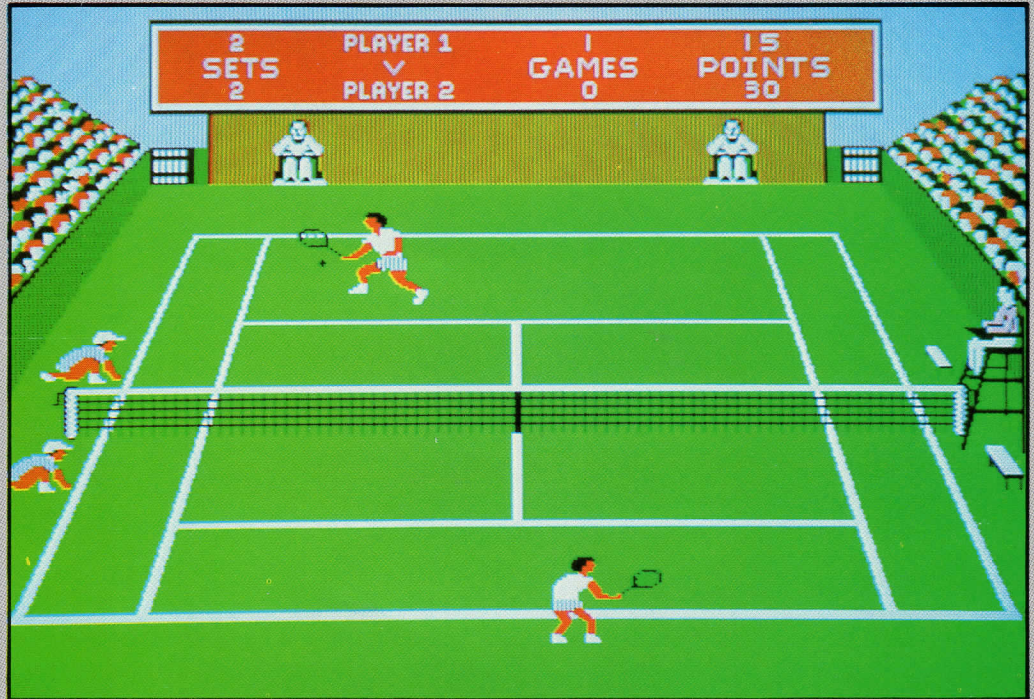
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